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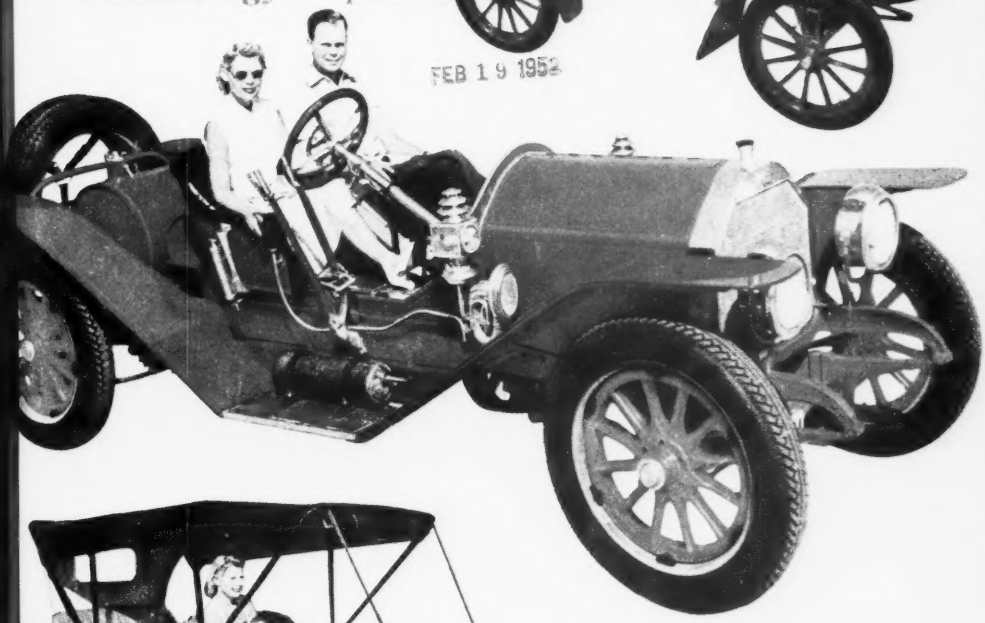

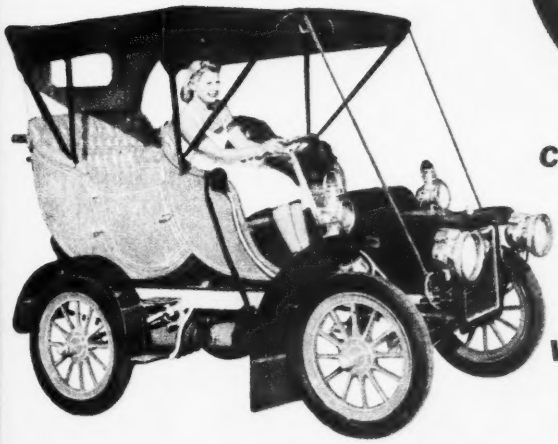

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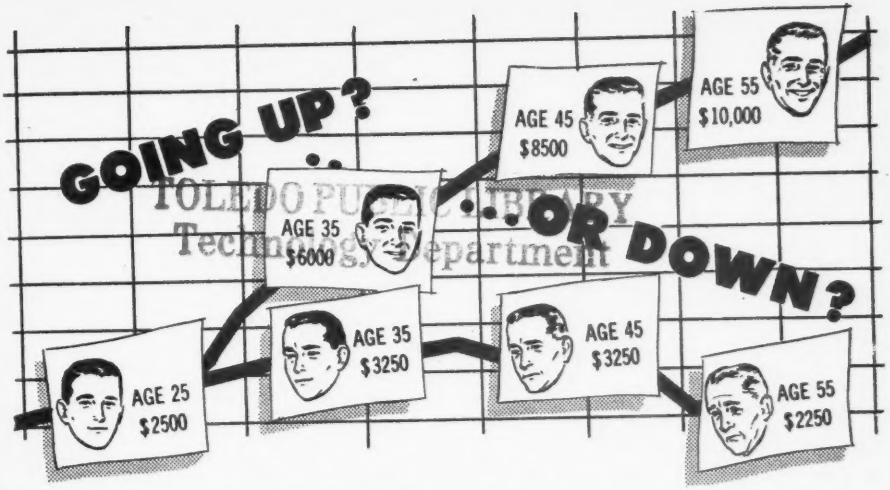

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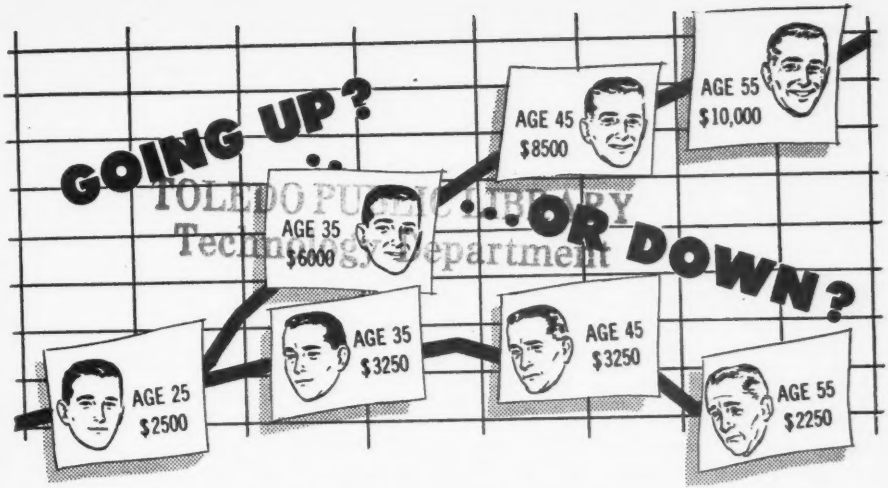

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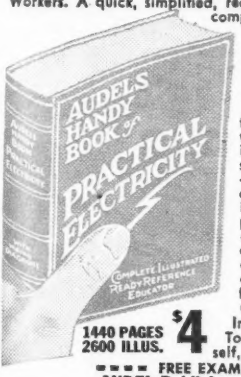

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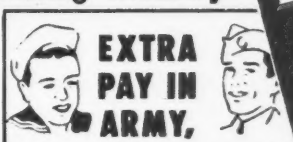

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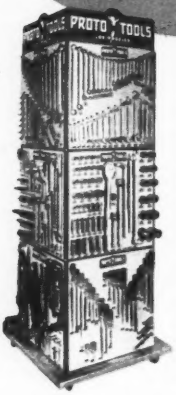

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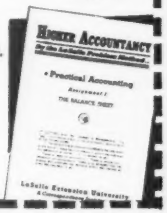

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The Editor's Workbench

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Nut And Bolt Inventions

PRODUCE a good nut and bolt combination which will not work loose under stress of vibration and you'll be on the road to fortune. That's a statement often heard in inventive circles.

But it's not completely true. The statement omits reference to any modifying requirements. It would be true only under the following conditions: the bolt-nut combination must be produced as economically as it is at present; tests must prove it to be as strong, as quick to remove or attach; the discovery must be an invention, not an adaptation of something old; the inventor or his agent must be able to locate a manufacturer and convince him of the superiority of the new invention and at the same time prove its potential financial value. And that's a big order.

These findings are not guesswork. They follow an examination of some 7,000 patents contained within 70 compartments in the Search Room of the U. S. Patent Office, all of which relate to nuts and bolts.

Among the nut and bolt designs you will find such things as top stop, positive lock, side lock, thread gripper, thread lock, superimposed nuts, oppositely threaded bolts, distorted nuts, distorted threads, longitudinal, radial and tangential keys, and so on for more than 40 sub-classifications grouped to simplify the task of the searcher.

Everything Not Yet Invented

With such a backlog of patents in this field, one might conclude that the chances for success here are limited. That conclusion is logical. Most of the items are in the public domain because the terms of the patents have expired. Hence, they may be used freely without payment of any royalties or other fees to the original inventors. Don't think that the common threaded bolt and nut in use today were selected out of thin air. Much engineering has entered into the design. Details can be found in any engineering manual. Research still is going forward with much help obtained with frozen plastic models which by interference patterns show how evenly the stresses are distributed.

However, since about 1930, standards have been established in the U. S. and some foreign countries which pretty much set sizes of nut heads, threads per inch, pitch and similar details. Because of this, the inventor of any tricky style of thread might find the future rather rough going. Knowing this in advance, you can steer clear of any headaches from this source.

But in this field, as in so many others, there are many questions still unanswered. Why does a bolt and nut loosen even after it has been pulled up tight and then anchored by a cross cotterpin? Does the face of the nut and bolt head flatten against the surfaces? Does the metal between cold flow? Do the threads yield? Did the bolt elongate? Or is a combination of these things responsible?

What Other Inventors Patented

To give you a rough idea of how some of the inventors tried to eliminate the trouble, let's look at a few of the patents in this field.

A longitudinally slotted bolt with a lock washer which could be crimped into the slot was patented in 1874.

The next year, John F. Wiles of London, England, protected a nut slotted almost across parallel with the face, with a lock or jam screw running through the top and bottom halves so that they could be brought closer together or forced apart to bite on the bolt threads.

A thin shoulder was added to the nut to

[*Continued on page* 16]

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

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CARL MILLER
REGISTERED PATENT ATTORNEY

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Invention Clinic

[*Continued from page* 14]

make it soft enough for a bit of the shoulder to be driven into the groove of the bolt in the design patent in 1876 by M. A. Spafford.

A beveled washer and beveled nut appear in the 1880 invention of J. G. Thompson. One bevel could be rotated against the other for greater stress between head and nut.

A lock nut in the form of U-shaped clip to come up to straddle opposite sides of each hexagon area is specified in the patent issued in 1883 to J. Q. Adams.

A threadless bolt was protected in 1885 by J. W. Morton. In this, a threaded sleeve fitted over the bolt. A cross pin held the sleeve from coming off but not against turning.

And so it continues right down to the present date. Pins of curved, straight or bent designs to fit into the work or bolt, passing in almost every possible way through or alongside of the nut. Then there are keys, clutches, wedges, ratchets, pawls, tongues, deformed or distorted bolts or nuts.

Some of the designs examined simply could not do the things claimed for them by the inventors. Often the entire strength of the bolt-nut combination would depend on a small pin or metal tab. If this should shear off the entire unit would come apart. Such things would have been discovered if models had been made and subjected to ordinary tests. In this field, models are relatively easy to produce and simple test equipment is easy to arrange.

Know Your Own Invention

Samples of new combinations should be applied to the work and stress should be applied with a garageman's torque wrench. Preferably half the number of the new items should be put in place. The other half should be of the common variety, pulled tight to the

[*Continued on page* 18]

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Invention Clinic

[*Continued from page* 16]

same value. If no torque wrench is available, a similar effect can be had through a strong spring balance applied to the free end of a box wrench. A good place for comparison is on some vibrating parts of an auto engine. Complete records should be maintained of all results, good or bad. While this will represent a rather poor engineering report, it is a step in the right direction.

Don't delude yourself—get to know your own invention. The new experimental units may be constructed of entirely different stock with greater or lesser strength. Either of these will give a false reading. So elongation or breakage tests should be made against comparative units. These too are well within the scope of the average machinist or garage mechanic.

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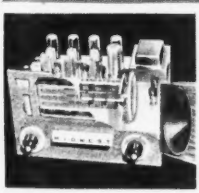

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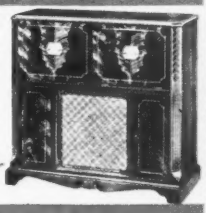

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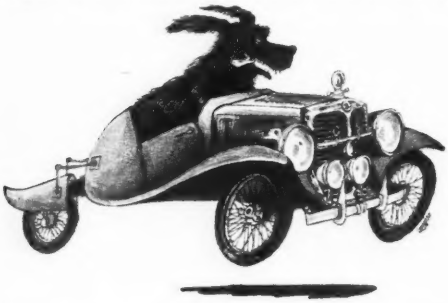
Dog-Owned Automobile

I've watched Tom McCahill's dog Joe always taking a back seat for many months. Now, I think Joe needs a change so he can again look another mutt in the eye. Therefore,



here is my Guiseppi Super Sports Car—complete with tail-steering and kennel club awards on the badge bar.

You see Joe, you don't have to take a back seat to anyone.

Dan Snyder
Milton, Mass.

We showed the drawing to Joe and he howled with glee. You make it, he says, and he'll test it.

Shooting For The Moon

I am writing in reference to an article in your December issue (Space Cops To Enforce World Peace, page 62).

How would the rockets be able to enforce world peace once they get up there? The size ship shown is incapable of carrying much armament. The only thing it could do is observe conditions on the earth and report back to a base. But, even then, it'd be moving pretty fast for training a telescope on one tiny spot.

I think they'd be better off shooting for the moon. It might be possible to establish bases there. I'm an amateur rocket fan myself, although I haven't been successful in getting one off the ground.

But, I'm still trying.

Wendell Wriker
Waldron, Mich.

Science Of Making Money?

With the kind assistance of your editors and readers, I'd like to carry out a little experiment.

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A. D. Kirkpatrick
Address withheld

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Here's a picture of an old bike I have which was purchased by my grandfather back

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I would like to trade it for a small young monkey.

"Pop" Brock
Wolfeboro, N. H.

[*Continued on page 27*]

Leonard C. Lane, B.S., M.A., Exec. Dir. of Pierce School of Radio and Television. Licensed by the State of N. Y. President of Radio-Television Training Association. Approved as a Correspondence School under the Laws of the State of N. Y.

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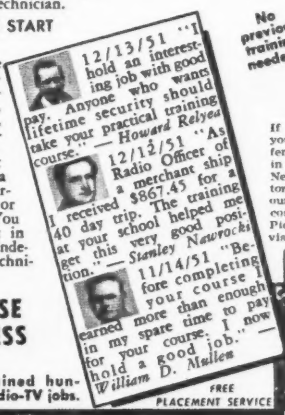

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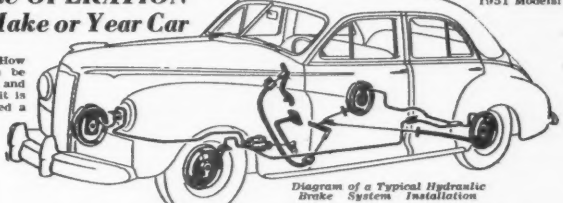

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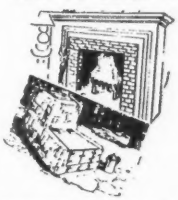

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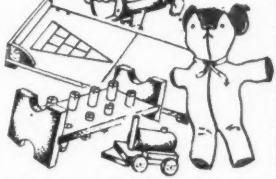

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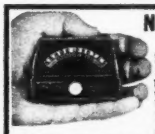

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IF YOU PLAN TO BUY A TV SET
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- ...What To Watch For When Buying!—Don't Be Cheated!
- ...Get The Top Trade-In Value On Your Old Set!

Tells You Everything You Have To Know

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- How To avoid being cheated.
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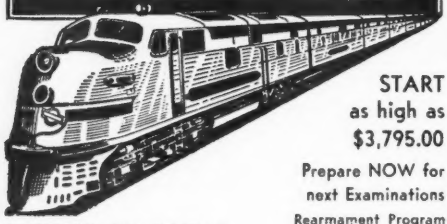

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Dear Editor—

[*Continued from page 20*]

Clock Problem Solved

Having had years of experience clock watching, perhaps I can help Dr. H. G. Warren solve his problem (Dear Editor, Dec. '51, page 35). He wanted to know the positions on a clock in which the hands are directly opposite.

Well, the key to the problem is that the clock's hands are directly opposite only 11 times in 12 hours. If you divide 11 into 12, you get 1 and 1/11 hours as the time interval between each of these positions. As the good Doctor knows that 6 o'clock is one of the positions, he simply has to add 1 and 1/11 hours to 6 and follow that same system through till he reaches six again.

Bert Isbell
Duncan, Okla.

Let the hands of the clock start together at 12 o'clock and let n represent the number of minute spaces the big hand travels until one of the desired situations is reached. Then, the small hand travels over $n/12$ minute spaces. Since the hands are directly opposite each other, we must have $n - n/12 = 30\,p$, where p is an odd integer. Letting p take on the successive values 1, 3 . . . 21 we obtain as the 11 occasions where the hands of the clock are directly opposite each other:

32 8/11 minutes past 12
38 2/11 minutes past 1
43 7/11 minutes past 2
49 1/11 minutes past 3
54 6/11 minutes past 4
6 o'clock
5 5/11 minutes past 7
10 10/11 minutes past 8
16 4/11 minutes past 9
21 9/11 minutes past 10
27 3/11 minutes past 11

Howard Eves, Chairman
Mathematics Department
Champlain College, N. Y.

Thanks to the 1,018 readers who sent me the answer to the clock problem (all correct).

Dr. H. G. Warren
Paducah, Ky.

Well, we're glad that one's solved. Besides the answers Dr. Warren received directly, our office was swamped with hundreds of solutions, too. Ready for another one? . . .

[*Continued on page 31*]

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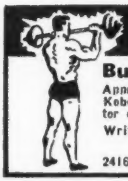

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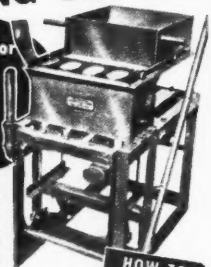

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Dear Editor—

[*Continued from page 27*]

Monkey Business Problem

Three thieves owned a pet monkey. One night they stole a bunch of bananas and decided to wait till morning before splitting them up. It was agreed that any extra bananas over an even division would be given to the monkey.

After they'd been sleeping a short time, one of the thieves woke up and, fearing his accomplices might cheat him, took one third of the bananas. He figured there would be one over an even distribution so he gave it to the monkey and went back to sleep.

Then, the second thief awakened, took one third of the remaining bananas, figured there would be one extra and gave it to the monkey.

Likewise the third thief—he took one third of the remaining bananas and gave one to the monkey.

Next morning, each decided not to tell the others what he had done. So, they divided the remaining bananas up, each taking one third. Since one was left over, they gave it to the monkey.

Now, what is the smallest number of bananas that could have been on the stalk in the first place in order to fill all the conditions?

Dr. J. C. Rivers
Mayfield, Ky.

[*Continued on page 33*]

"Mother just washed the car—now she's going to spin-dry it."

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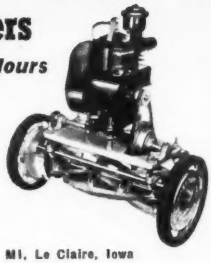

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Dear Editor—

[*Continued from page* 31]

The Nearest Approach

In your December issue (page 57) you had an interesting story called Santa Claus In Disguise. I got a very pleasant surprise upon turning to the second page. The girl in the picture is an exact twin of a girl I know very well.

Could you send me her name and address, please?

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Helpful hints on wiring new lamps and converting old ones to give modern three-way lighting are contained in a free booklet entitled How To Wire Lamps. Also included are ideas for designing original lamps. Address requests to Monowatt, General Electric Co., Providence 7, R. I. . . . *The Allied Radio Corporation announces the release of its newest buying guide, a 208-page catalog listing all types of radio, TV, and hi-fi parts, as well as test equipment, public address systems, tools and hardware. Free copies are available by writing to the company at 833 West Jackson Blvd., Chicago 7, Ill.* . . . Speaking of radio equipment, a new type of record album entitled Code Made Easy is now available. This method was used in Army radio schools, where it was successful in slicing in half the time needed to teach code to radio operator trainees. The album is comprised of two 10-in. 78 rpm disks, and is sold by the Raybrun Co., Box 66, Orangeburg, N. Y. . . . *How To Build Farm Buildings That Last Longer is a free pamphlet published by the West Coast Lumberman's Association, 1410 S. W. Morrison St., Portland 5, Ore. Included are tips on the proper construction of foundation forms, wall bracing, roofs, corncribs, etc.* . . . The 29th edition of Kodak's classic guide, How To Make Good Pictures, is now on sale. Practically every field of picture-taking is covered, and there's a basic chapter on developing, printing and enlarging. The 224-page book, priced at $1, is available at most camera supply stores, or it may be ordered from Eastman Kodak Co., Rochester 4, New York. . . . *Television Doctor is a useful book that tells the TV owner how to apply "first aid" to his set. About 70 picture trouble symptoms are listed alphabetically, each given a separate code number. By consulting the list and combining the code numbers, the reader refers to a trouble location guide which indicates where the defect is located. The book may be ordered from the author, H. G. Cisin, 200 Clinton St., Brooklyn 2, N. Y. Price: $1.* . . . A pocket-size tool catalog, available on request, has been issued by Duro Metal Products Co., 2649 N. Kildare Ave., Chicago 39, Ill. It illustrates the complete line of hand tools made by this company (from a screwdriver to 114-piece tool sets), and includes as well a great deal of interesting and available information for mechanics. . . . *What you should know about modern fire-fighting devices is contained in a 32-page illustrated booklet entitled Correct Fire Protection, published by the American-LaFrance-Foamite Corp., Elmira, N. Y. It also describes the various sizes of units available for use with the different kinds of fire extinguishing agents.* . . . Pygmy catalogs put out by the South Bend Lathe Works are only 2½x1⅝ in., yet each of these accordion-pleated jobs expands to 35 in. in length and contains 28 pages of clear illustrations and text describing all important products manufactured by the company. For your copies, write to the company at South Bend 22, Ind., and ask for catalogs 5104 and 5119. No obligation. •

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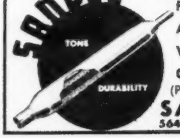

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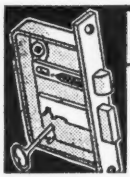

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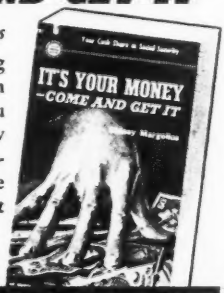

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CONTEMPORARY STRUCTURE IN ARCHITECTURE by Leonard Michaels; Reinhold Publishing Corp., 330 W. 42nd St., New York; 230 pages; $10.00.

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YOUR CRAFT BOOK by Newkirk and Zutter; International Textbook Co., Scranton 9, Pa.; 212 pages; $5.00.

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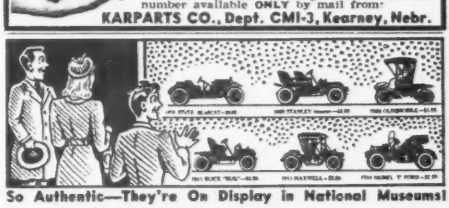

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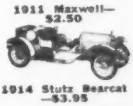

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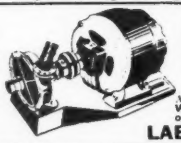

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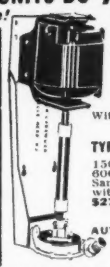

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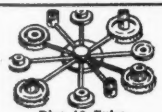

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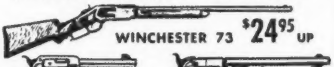

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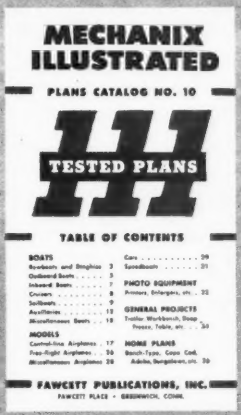

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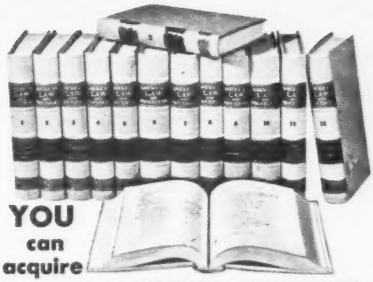

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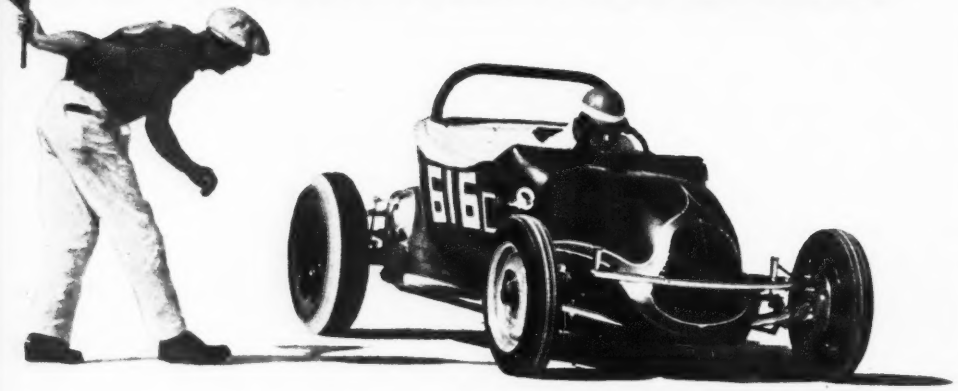

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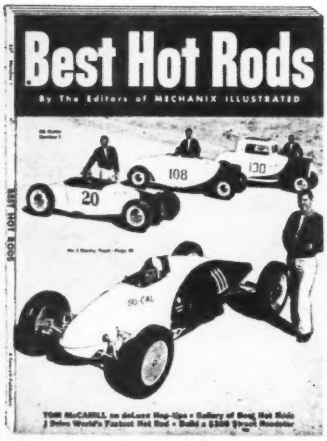

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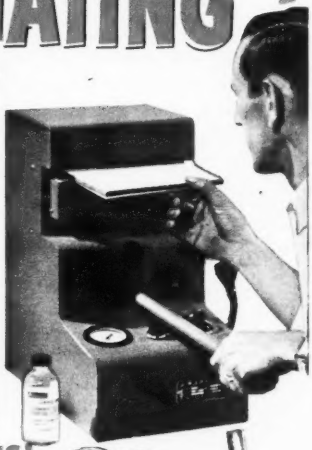

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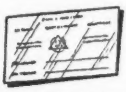

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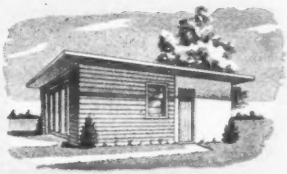

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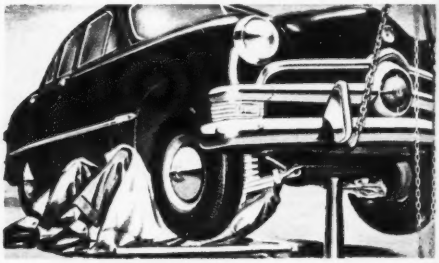

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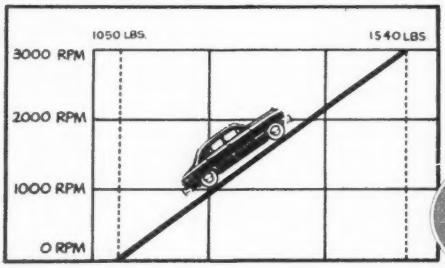

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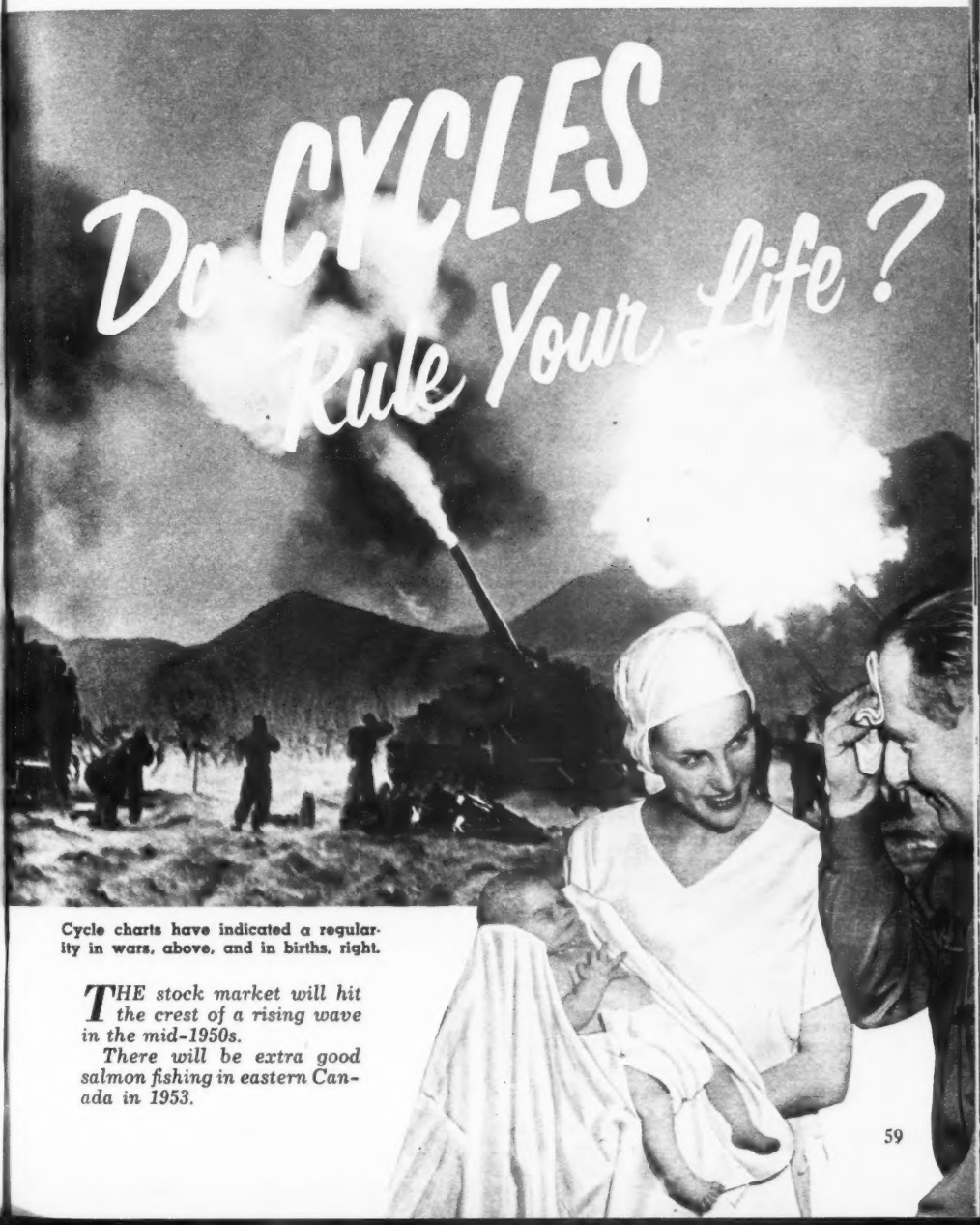
If science manages to chart the rhythms of the universe, the world may be able to predict its own wars, depressions and epidemics.

By Lester David

special features..

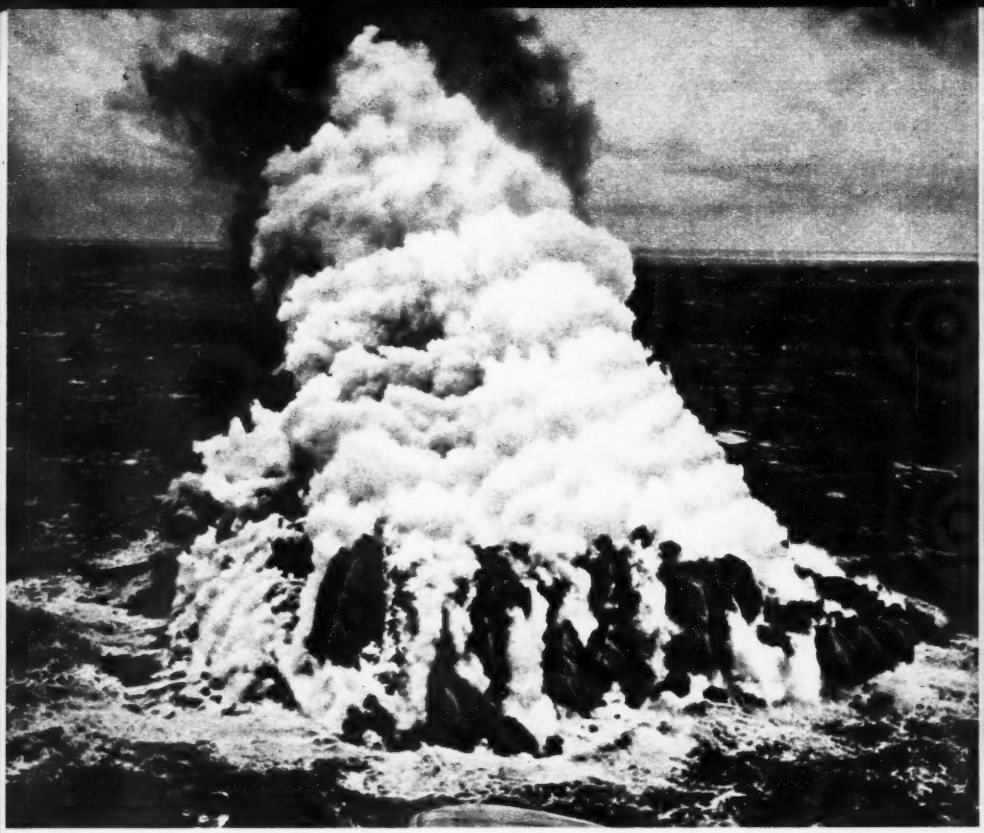
Do CYCLES Rule Your Life?



Cycle charts have indicated a regularity in wars, above, and in births, right.

THE stock market will hit the crest of a rising wave in the mid-1950s.

There will be extra good salmon fishing in eastern Canada in 1953.



Japanese Professor Omari was recently able to predict that a long dormant volcano on one of the Kurile Islands would erupt again. His cycle charts indicated volcanic activity every 65 years. Here, 200 miles south of Tokyo, a new volcanic island group pushed its way up from the floor of the sea.

Diphtheria and influenza will strike hard in the U. S. in 1953.

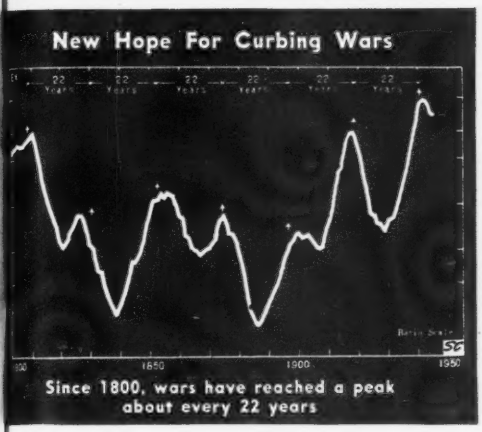
These predictions, and many others, are based on an amazing yet little known science—cycle research. A group of some 3,000 scientists, delving deep into history, is charting the occurrence of wars, business activities, disease, weather, earthquakes, floods, volcanic eruptions—even your own emotions.

And they have discovered that these things happen over and over again in distinct, rhythmic cycles—cycles which can be projected into the future!

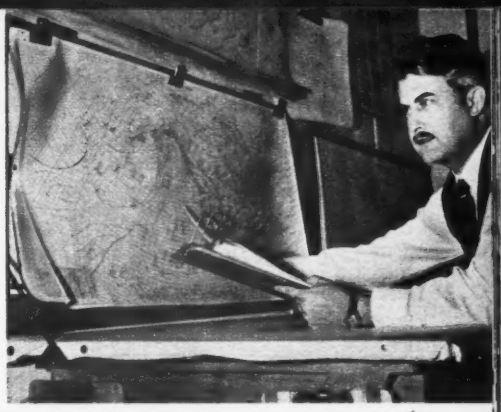
Intensive studies have been going on for years and right now the scientists are closer than ever before to a tremendous discovery. For thousands of years men have tried—and failed—to find a foolproof method of peering into the misty future. Now for the first time, a science whose adherents include some of the most eminent thinkers in the world is showing promise of lifting the veil of secrecy from great events of the future.

Here is what the Foundation for the Study of Cycles, an organization formed in 1940 to carry on intensive research in the field, declares in its official bulletin:

"Wherever we have regularity, we are at the heart of predictability. The power to predict accurately is the acid test of the degree of precision reached in any science. Whenever cycles have repeated themselves enough times, and with sufficient regularity so that they cannot reasonably be the result



Cycles indicate that churchgoing, top, reaches a high every nine years. Chart above, issued by Foundation for Study of Cycles, shows that major wars seem to recur at intervals of about 22 years.



Long-range weather charts as well as current ones help Dr. Irving Krick, top, predict weather. In future, you can hold off building your new house till cycles indicate end of building boom, above.

of chance, we cannot ignore the possibility that they may continue."

That statement is backed by such members of the foundation's committee as Harold G. Bowen, executive director of the Thomas A. Edison Foundation; Harlow Shapley, director of the Harvard University observatory; Harold E. Anthony, curator of mammals of the American Museum of Natural History; Charles G. Abbot of the Smithsonian Institution; and Julian Huxley, director general of the U. N. Educational, Scientific and Cultural Organization.

What have the cycle scientists found out so far? These are just a few of the recent results of their exhaustive labors:

As far back as figures are available, the stock market has gone up and down in cycles of about nine years in length.

From the year 1400 to the present, international battles have shown a distinct 22-year cycle, an average of 11 years of relative peace followed by 11 years of relative conflict.

Churchgoing reaches its high point every nine years.

In certain areas of the world, births of new babies are at their peak every 29½ days.

Disease recurs at regular intervals—influenza and pneumonia every three years, diphtheria every seven years, measles every two years, whooping cough every 41 months.

The overwhelming importance of cycles is clear—if things have happened over and over in the past in a regular pattern, that

pattern can be mapped and thrust into the future!

And there are many specific ways in which the cycle scientists envisage the practical adaptations of their work. For instance, long-range weather charts, extending over a much longer period than is now possible, would be drawn up. These could prove to be of immeasurable importance to farmers, fuel companies, clothing manufacturers—in fact, to any individual or industry for whom the vagaries of the weather are of prime importance.

Business men, knowing far in advance when recessions will strike, could prepare for them by reducing overhead and inventories, thus preventing the bankruptcies which follow in the wake of unexpected business dips.

The tragedies which ensue when earthquakes, tidal waves, volcanoes or forest fires suddenly strike, could be minimized if adequate warning were given to communities.

If the abundance of game fluctuates in regular cycles, special conservation methods could be rigidly enforced at the bottom of the curve and more hunting and fishing could be permitted at the crest in order to insure a continued balance.

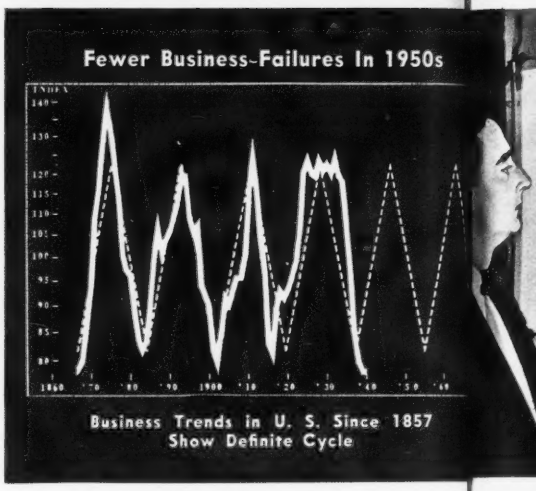
And cycles could help you in your daily life too. If you're planning a fishing trip, for example, you'd be able to consult a chart which would tell you just exactly how the catch will be in the spot where you're heading.

You could take special precautions against disease; you could stock your larder with food items which will be in short supply; you could hold off building your house until after building construction hits a peak.

Predictions based upon cycles are by no means just a laboratory curiosity. Here are only a few of the predictions all over the world which came true:

A Japanese professor, Dr. Omari, issued an urgent warning to the inhabitants of one of the Kurile Islands north of Japan that a long-dormant volcano was getting ready to belch fire and flame. He even specified the month when lava would begin to flow down its steep sides and cascade through the crude native villages. But the people scoffed—the volcano had not erupted for generations.

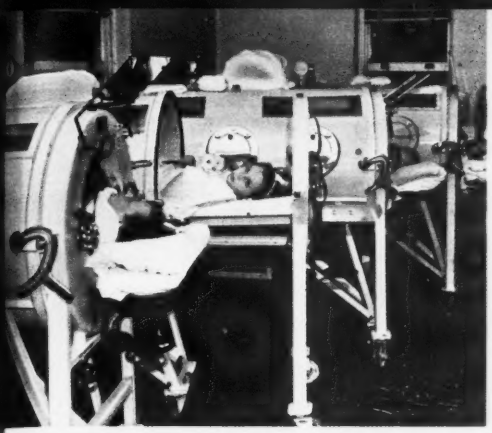
Almost to the day designated by Dr. Omari, a low, ominous rumbling came from the depths of the crater. It grew louder and louder and then, with a sudden, thunderous roar, the volcano began to pour its horror and devastation over the countryside.

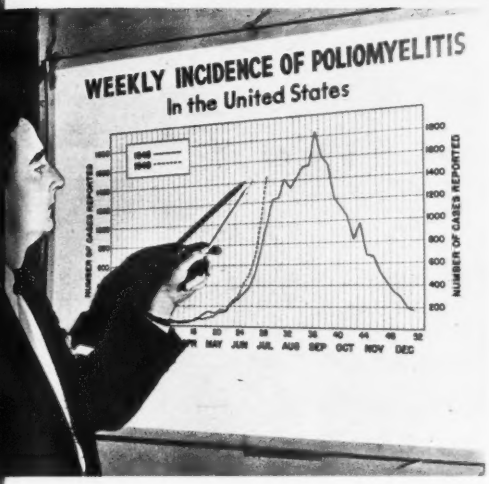


According to a recent cycle survey, above, the floor of the New York Curb Exchange, top, will be a busy place for the next few years as the stock market hits crest of rising wave in the mid-1950s.

Dr. Omari is no black-robed, crystal-ball-gazing Merlin of the Orient. He had scientifically studied the actions of volcanoes in the eastern hemisphere, learned they tended to erupt at periodic intervals and found that the one in the Kuriles had exploded every 65 years for centuries. He had projected the cycle and mapped the next blowup.

In another corner of the globe, the Hudson's Bay Company of Canada found that in some years Indian trappers brought in huge quantities of lynx skins, and other years they brought in few. Everyone accepted the fact that lynx were simply more





Through the study of cycles it has been found that diseases occur at regular intervals. Above, polio epidemic coordinator studies charts which indicate an August-September high period, top.

Female fashions run in 35-year cycles, reported recent style researchers. At that rate, you can expect to find that bustles are back in style in this country somewhere around the year 1970.

abundant from time to time but no one did anything about it until an enterprising company official dug into the records and charted the number of pelts brought in from 1844 on. He learned that some years there were as few as 4,000, and as many as 70,000 in others. But there was a regular, rhythmic pattern in the figures—they ebbed and hit a peak every nine years!

Thus, knowing in advance what the intake would be, the company was in a far better business position right down the line.

In still another corner of the world—Bombay, India—scientists discovered that the plague made its visitation for 20 consecutive years at intervals of one year and four days, almost to the hour. Based on cycles, an influenza epidemic was predicted for the U. S. for 1950 and it arrived on schedule.

Back in the 1870s, Samuel Benner charted a long-range cycle of pig-iron prices, predicting the highs and the lows. And for more than 70 years, his forecasts have been phenomenally accurate. Many men have made fortunes by following his predictions.

In 1939, Professor F. A. Pearson, W. I. Myers and G. E. Brandow, at that time all of Cornell Uni- [*Continued on page* 174]

Bubble Trouble

It's dangerous work, too. Here, a sewage worker slips on platform and foam almost engulfs him.

Streams of water from high-power hoses are directed against the suds by plant employe.

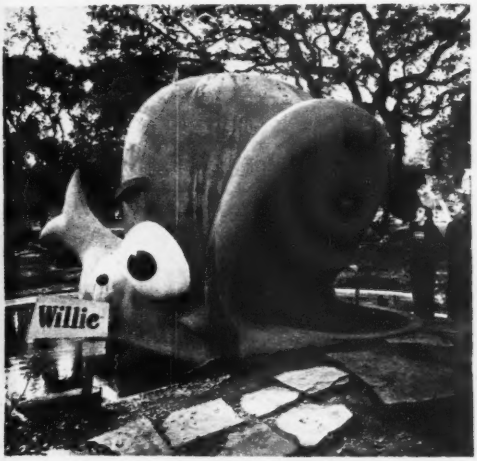
NEAR Los Angeles, there's a crew of male workers whose job it is to break bubbles. At Hyperion Activated Sludge Plant—the largest garbage disposal unit in the world—the foamy froth which housewives wash down the drain presents a real bubble problem. For the suds foam up again at the plant and form gigantic cloud-like shapes which are a perfect breeding place for bacteria. So, five men are employed full time to break up the foam with streams of water from high-powered hoses and to pour anti-foam solution on the material rising from the vats. •

Very often the white froth completely covers the men working on the slippery platforms.

Children's Fairyland in Lakeside Park, Oakland, Calif., includes Noah's Ark which houses a pair of very active monkeys and floats in a small lagoon.

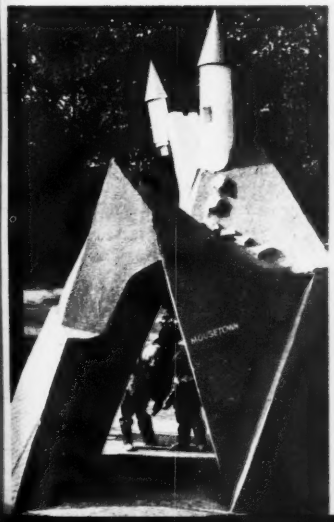
The Little Red Schoolhouse is the home of Carrie, the black sheep and Mary's little lamb plus mama. Eighteen sets spread over two acres, cost $50,000.

Fairy Tales Come to Life



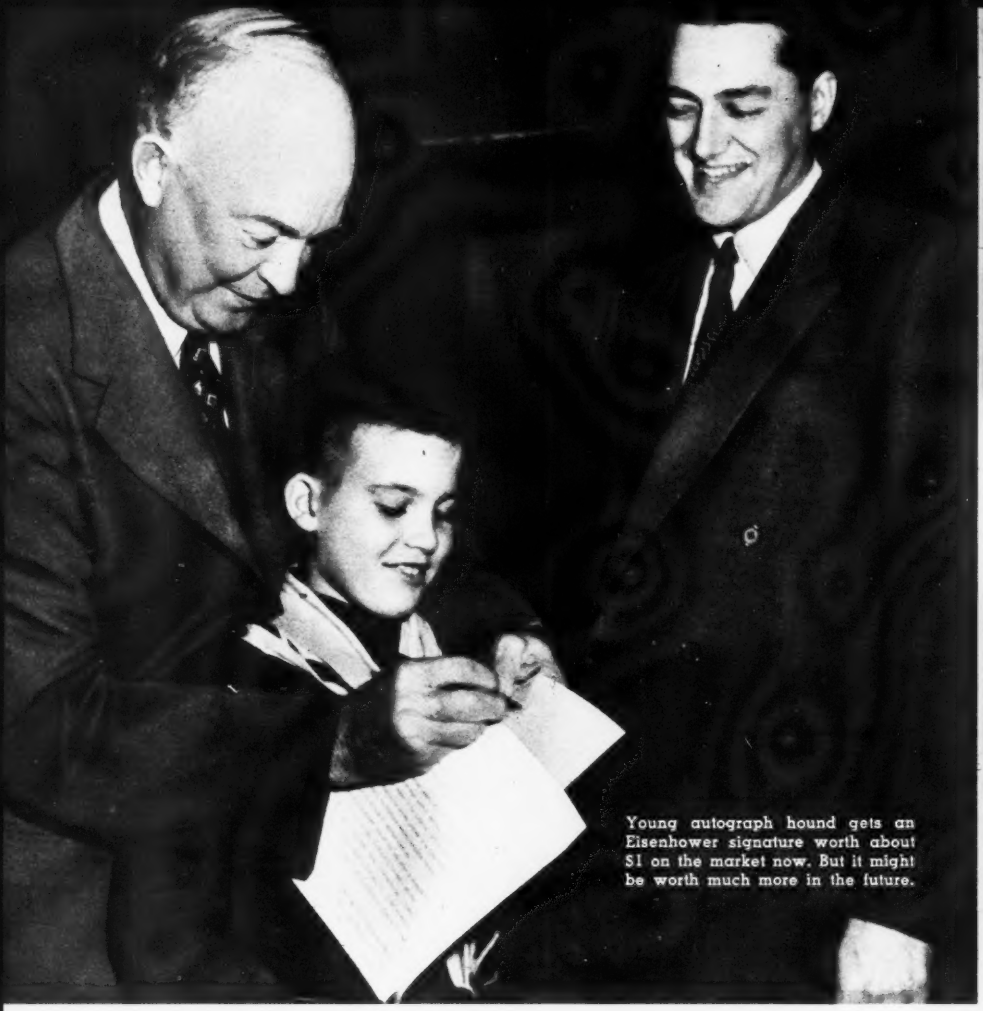
Willie the Blue Whale is one of the most popular attractions. A ramp leads down his open mouth into his tummy where real fish swim in a plastic bubble.

In a castle in Mousetown lives a family of white mice. Most city children never saw sheep, mice, pigs before Fairyland.



Hickory, Dickory Dock is made so that when white mice run on a tread line, clock strikes one, delighting the youngsters.

Goosey, Goosey Gander's castle has towers of purple, yellow and raspberry. Two geese live in surrounding moat.



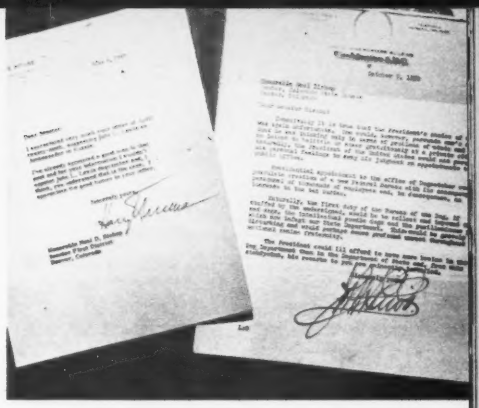
Young autograph hound gets an Eisenhower signature worth about $1 on the market now. But it might be worth much more in the future.

Golden Signatures

By E. R. Kurnik

Whenever great men take pen in hand, they create valuable historical documents, avidly sought after by America's autograph collectors.

Chicago's famous autograph collector, Ralph Newman, examines a display of historical documents from Geronimo signature to Patrick Henry note.



President Truman's letter in which he said "I wouldn't appoint John L. Lewis dogcatcher" and Lewis' comment on the note were also shown.

Gallery of autographed photos of great people was started when Eddie Sousa was in hospital. He's very selective about people he collects.

Inspecting a letter written by George Washington at the age of 17 is Dr. A. S. W. Rosenbach, one of the best known autograph collectors in America.

AT the National Antique Show held in New York City recently, a New Jersey housewife presented a bundle of letters for evaluation. She had found them in her attic. Sigmund Rothschild, well-known appraiser, looked them over carefully.

"Madam," he said excitedly, "these letters are a very important historical find."

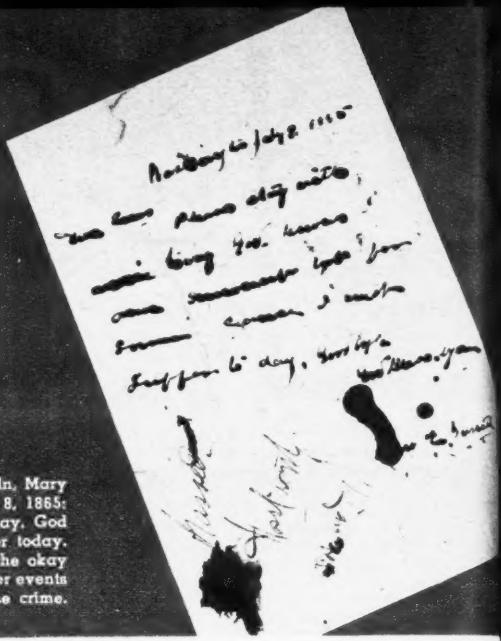
Six of them proved to have been written by Abraham Lincoln's wife Mary to Abram Wakeman. Rothschild valued them at more than $100,000.

Naturally, finds of such magnitude are quite rare. But smaller autograph discoveries are constantly being made. For America's thousands of autograph collectors make it their business to find out all they can about autographs and thus spot valuable signatures, documents and letters. And even if they don't come up with a $100,000 find, this rapidly growing hobby brings them vast enjoyment and mental stimulation.

Autograph prices range from 40 cents for a Betty Grable signature to $260,000 for a copy of the Declaration of Independence. Perhaps you never thought of that document as an autograph but among real collectors an autograph may refer to a handwritten letter, a signed manuscript or document, a signed photograph or just a signature.

Let's start with low-priced autographs. Among signatures and signed photographs

Carved on a desk in the Royal Dramatic Theater of Stockholm is the name Greta Gustafsson. It was put there by a young Swedish girl now called Greta Garbo.



Condemned to die for conspiracy in the death of Lincoln, Mary E. Surratt wrote this historic letter from prison on July 8, 1865: "Dear Em—Please stay with Annie (her daughter) today. God knows I am innocent but for some cause I must suffer today. Goodbye. God bless you." Scribbling in lower left is the okay of prison commandant. She was hanged that day but later events seemed to prove that Mary Surratt was innocent of the crime.

the following values are listed by a leading autograph dealer: General Douglas MacArthur, $3.50; Ingrid Bergman, $1.50; Fred M. Vinson, $3.00; Enrico Caruso, $.50; Capt. Eddie Rickenbacker, $1.50.

The above prices are partially determined by the nature of the autograph—whether it's a plain signature, a greeting or a signed photograph. Other factors that determine the value are the popularity of the person who wrote it, the contents, the rarity, condition, time and circumstance of the writing.

What are the big-money autographs? Back in 1927 a Mamaroneck, N. Y., family cleaning out the barn, came across a letter signed by Button Gwinnett and two other signers of the Declaration of Independence. The lucky family received $51,000 for that piece of paper.

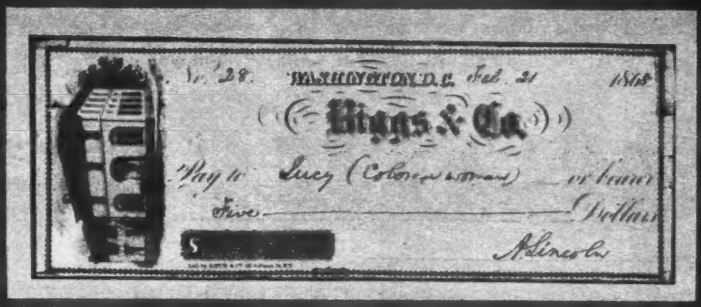
Why? Because Button Gwinnett's signature is the second rarest among the signers of the Declaration. The rarest of all is Thomas Lynch, Jr.'s. Current prices for Lynch, Jr. or Gwinnett range from $2,000 to $10,000. If you have a complete set of signatures of the signers of the Declaration, count yourself fortunate. There are only 36 complete sets, valued at up to $200,000. So, count yourself wealthy, too.

Uncover any of the following autographs and you'll be able to take it easy for a while: a letter written by William Henry Harrison during the 30 days that he was President of the United States; any writing of Captain John Smith; original manuscripts of Herman Melville or Edgar Allan Poe.

Skipping across to Europe, if you can dig up autographs of Moliere, Michelangelo, Luther or Beethoven you're a lucky collector. Currently the National Arts Foundation of New York City is searching for Mozart manuscripts that were stolen during World War II from caskets stored near Salzburg, Austria. The Foundation is offering a reward for any information leading to their recovery and stands ready to purchase any of the missing material and to return the manuscripts to the Mozarteum, a museum. The chances of your discovering an original letter written by Shakespeare are slim, but if you do, you'll be able to name your price and retire. So far his signature has been found only on legal documents.

If you come across something that looks as if it might really be valuable, what should you do? Well, contact any autograph dealer who specializes in the field. When there is big money at stake, consult with one of these experts rather than a dealer who handles other items such as antiques, as well. You can check the reliability of an autograph firm by consulting a university librarian or the head of your nearest historical society. If they cannot advise you, write to the Librarian of Congress in Washington. Then, when you have chosen your dealer, send your find to him by registered

Because of unusual way this Lincoln check was made out, it's valued at about $600. Regular Lincoln checks are now worth not more than $100.



One of the most elusive signatures on the Declaration, Button Gwinnett, is often forged. At right is the real thing, below, badly forged signature.

Button Gwinnett

Button Gwinnett

mail. Usually it isn't too helpful to describe the autograph in a letter since a dealer can't judge accurately without examining the original.

The National Society of Autograph Collectors at 285 Madison Ave., New York 17, N. Y., can also help you with your autographs. Annual membership in the Society is $5, which includes quarterly issues of the Autograph Collectors' Journal. You may write to the Society concerning your finds and they will refer you to the dealer or collector whom they believe would be interested.

Sometimes letters of unknowns have considerable value simply because they shed light on certain periods of history. A baker from Atlanta, Ga., found some letters recently which had been written by his grandfather, a [*Continued on page* 176]

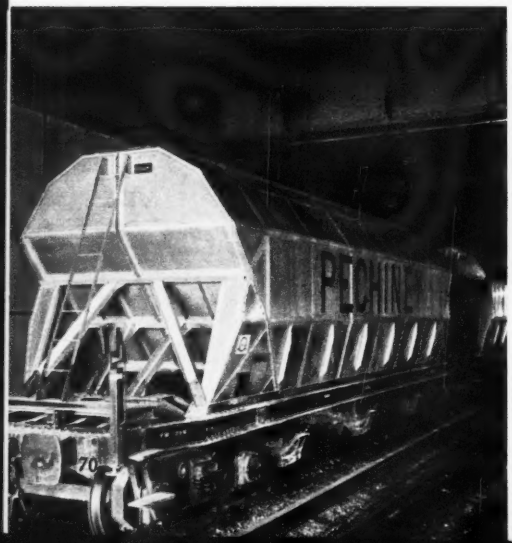
More than 200 celebrities have autographed the bass viol of merchant seaman Walter Jecker. Here, Ida Lupino burns her name into highly prized bull fiddle.

Long Undies for GI's are given a test by Robert Woodbury, center, an analyst for Quartermaster Corps. Scene is the Pentagon Lagoon on the Potomac in Washington. It is waterproof, protects against cold.

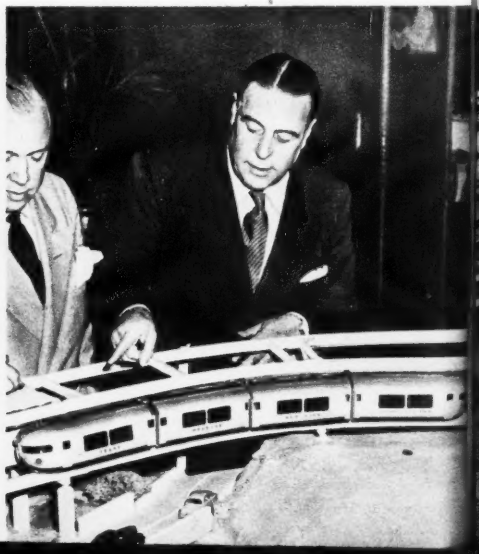
Road Widener not only digs a trench two feet wide and two feet deep at the edge to take the foundation, but dumps the dirt into a truck, right. Operating near Cheltenham, Eng. it does the work of 40 Britains.

NEW in SCIENCE

Lightweight Freight on exhibition in Paris, France weighs only 80 tons per car and so can carry 65 tons of material instead of 55 tons normal to a carrier its size. Its present job is to haul aluminum ore.



Railplane is a new mass transit system proposed for Los Angeles. Streamlined cars will be made of aluminum, supported and propelled by wheels riding on a single track below, guided by top rail. Speed: 150 mph.



Lead-Lined Suit specially designed to protect against radioactivity in an A-blast, was designed by Leo Pauwela of Los Angeles and is modeled here by his son. "If it doesn't land on us, we're safe," they say.

Remote Control Typewriter can be operated by a person sitting or lying in bed. Fingers are placed over the keys and no pressure is necessary. Device was shown at Aids for Crippled Exhibit, London.

No Midget Ships but pylons, part of an F-84 Thunderjet. Suspended beneath each wing, they hold auxiliary gas tanks or armament such as bombs, rockets, napalm tanks. Westinghouse makes them.

Simple Farm Tractor—even a child can operate it as shown in Bolzano, Italy. The Allgaier A-22 is German made, powered by a 22-hp Diesel and costs about $3,200. It can be used for most farm work.

Lures That Catch Money

Bill Powell disliked the fishing lures on the market so he designed one for himself, then went into business making and selling them.

Mrs. Karl Englund has a full-time job at the Powell house. She ties on the fuzzy bucktail.

Bill Powell, Jr. pours molten lead into molds to form the head assembly of his pop's artificial bait.

When orders pile up, production line consists of next-door neighbors working on a part-time basis.

In the basement of their Kansas City, Mo., home, the Powells paint eyes on the Two-For-One lures.

Hollywood's Funny Money Man

LEW O'Callahan turns out millions of dollars each year in his own personal mint and the Treasury Department doesn't give him a tumble. Although his money is as phony as a three-dollar bill, it never gets beyond the Hollywood movie cameras.

For 31 years Lew has been quietly but legally turning out everything from tissue-thin five-pound notes to crisp green pesos, from Confederate money to French francs. And just think—the Internal Revenue boys haven't been able to touch a cent of it! •

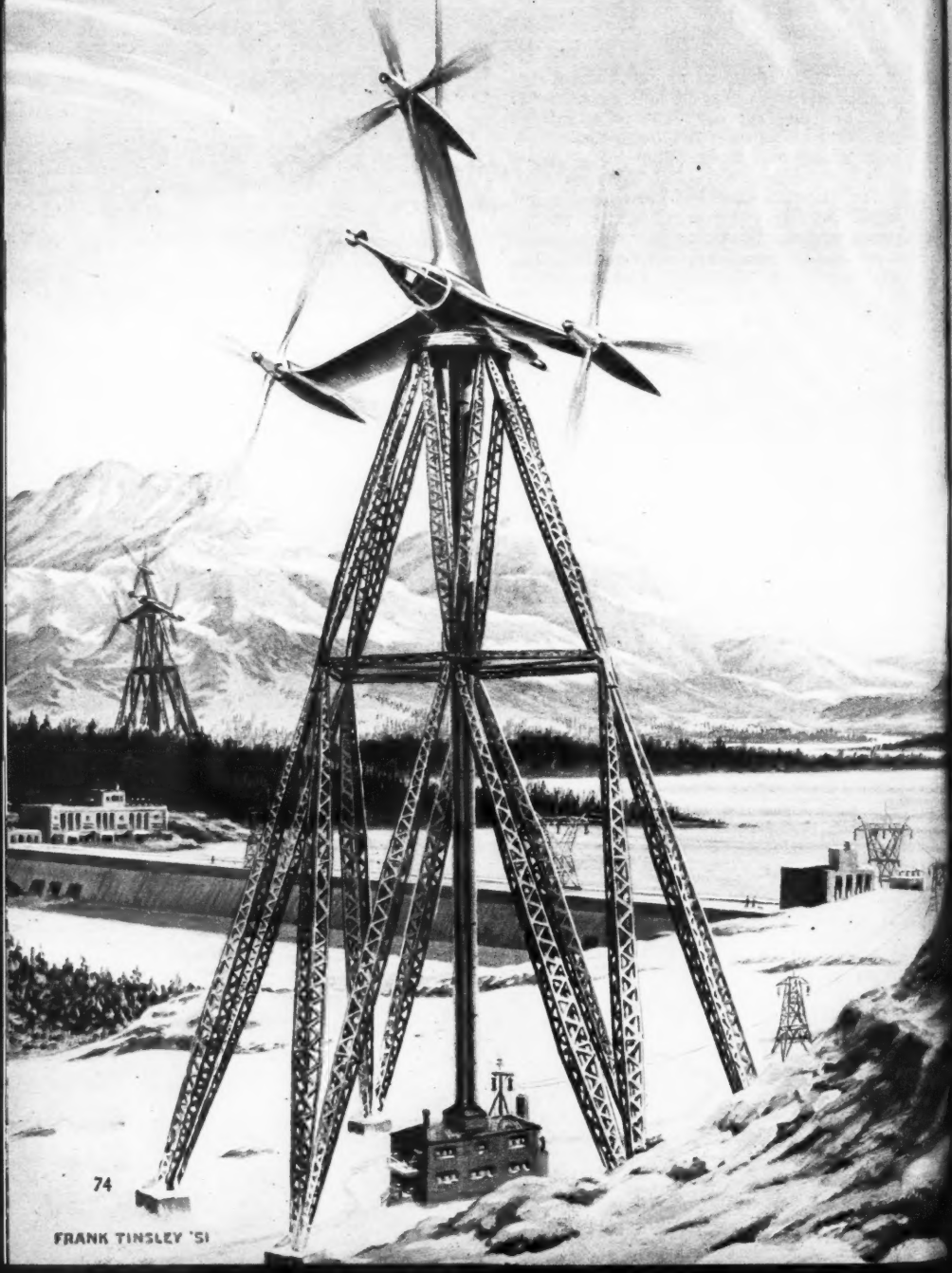
When Paramount Pictures' Rhubarb the cat inherited a ball club and $30,000,000, guess who was behind the scenes and really supplied the cash!

Ten dollar bills in top photo? No, they only look like 'em but they impress starlet Mary Murphy. It's great how Lew tosses money around, above.

These coins copied and designed by O'Callahan are ancient as well as modern and pass off easily before the camera. Some pieces are made by hand.

Ever see a million bucks in thousand dollar bills? Well, you're looking at it here but don't try to pass any of it outside of a Hollywood studio.

SUPER-WINDMILLS



FRANK TINSLEY '51

Pla
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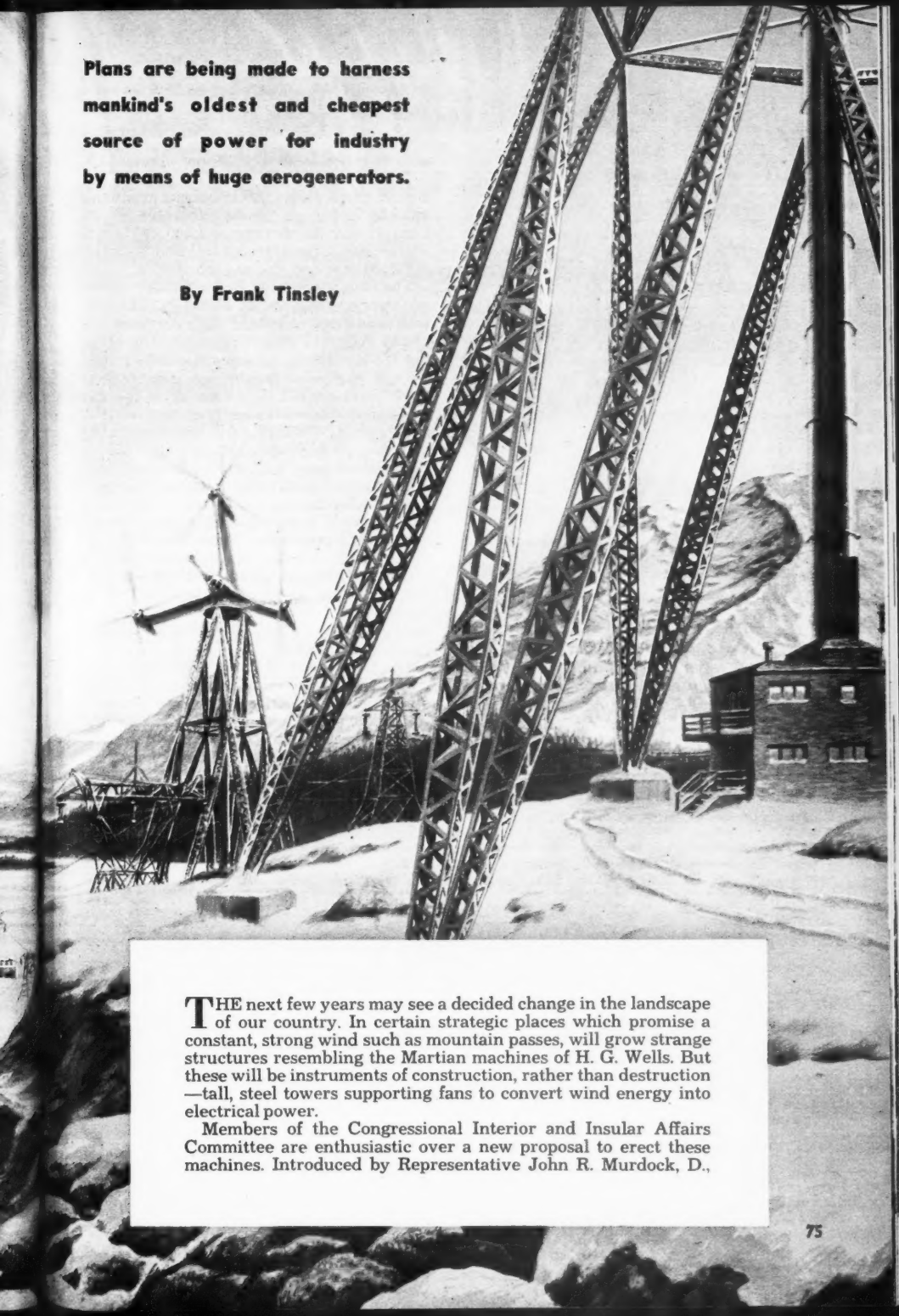
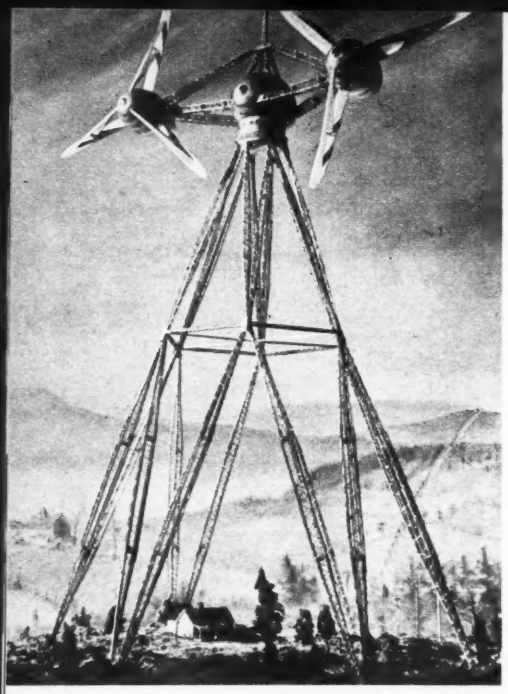
Plans are being made to harness mankind's oldest and cheapest source of power for industry by means of huge aerogenerators.

By Frank Tinsley



THE next few years may see a decided change in the landscape of our country. In certain strategic places which promise a constant, strong wind such as mountain passes, will grow strange structures resembling the Martian machines of H. G. Wells. But these will be instruments of construction, rather than destruction —tall, steel towers supporting fans to convert wind energy into electrical power.

Members of the Congressional Interior and Insular Affairs Committee are enthusiastic over a new proposal to erect these machines. Introduced by Representative John R. Murdock, D.,



Scale model of the new super-windmill proposed by Percy Thomas. Generator is contained in head.

Ariz., chairman of the committee, a bill drawn up by the Department of the Interior and endorsed by the Federal Power Commission authorizes a $2,750,000 government project to build a test aerogenerator.

In 1941, a full-scale instrument was built on a mountain top in Vermont and hooked up to the high tension system of the Central Vermont Public Service Corporation as an auxiliary power source. Mounted on a 110-foot tower, its twin 56-foot blades were designed to develop 1,200 kilowatts at a wind velocity of 30 mph. Under favorable conditions, it actually developed 1,400. Although a practical success, structural and financial difficulties ended the experiment.

The newly proposed design is the product of years of research by Percy H. Thomas, well-known power plant engineer formerly of the Federal Power Commission. Towering 475 feet above the ground and equipped with a pair of three-bladed impellers, it operates automatically in a wind as light as 10 mph. At its maximum required velocity of 28 mph it delivers 7,500 kilowatts. During dangerously high winds the impeller blades can be feathered and braked to a halt and the structure is stressed to withstand hurricane velocities up to 200 mph. The plant is completely self contained with a central generator, converter, transformer, etc., mounted in a rotating housing atop the tower. The energy developed by the 150-foot diameter impellers is transmitted to the generator through geared-up shafting. All parts of the plant are accessible for inspection and repair.

The techniques of modern airplane construction suggest the possibility of further development of this design. (See illustration.) The use of light metals would lighten loads and relieve stresses. A central tubular elevator shaft would strengthen the structure, provide easier access to the operating head in foul [*Continued on page* 167]

This design with 175-ft. fan was tested on Grandpa's Knob, Vt. It worked well for three weeks.

The farmer's wind generator for pumping water is efficient, has been popular for over 100 years.

British test generator in North Scotland is capable of standing mild winds or strongest gales.

THIS MONTH'S PRIZE

Tire-Change Wheel Jack

Tire fits into a semicircular metal band and is held firmly by a spring. Jack will hold the tire upright all by itself while sliding toward hub.

WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Gadget Editor, Mechanix Illustrated, 67 West 44th Street, New York 18, N. Y. Each month the best entry will be given a cash prize of $50.

HEAVY metal wheels and jumbo-cushion tires haven't simplified the job of changing a wheel when you get a flat. Usually it's easy enough to get the old wheel off but getting the new one on can be tough. From a crouch or on your knees you must lift it and line it up so a little stud pops through a hole in the wheel. Most of the time either the stud or the hole or both never seem to cooperate. Fred Varabeau of Melfort, Saskatchewan, Canada, decided he's changed a wheel the hard way for the last time. He sat down and designed a gadget that makes the process child's play. It's a rack which grips the tire firmly. All you have to do is slide it toward the hub and lift. The wheel flops on the hub, the stud slides through its hole and presto! you're all set. $50 to Mr. Varabeau for making life a bit simpler for oppressed motorists. •

When wheel is in position and hole is lined up below the stud, a slight lift on the handle of the jack will raise the wheel so the stud can slide through the hole. It's easy, as the girl in photo below demonstrates. No more of the old-fashioned lift-and-push method, lower right.

His Business is Laying An Egg

Everybody knows a tree grows in Brooklyn, but it took Murray Weiss' egg farm to prove that hens could thrive there, too.

At egg-collecting time, left, owner Weiss makes rounds of triple-tiered cages, gathering eggs which have rolled down into the cooling trough.

Brooklyn housewives come right to the farm's front office, right, to make their purchases of fresh eggs. If they like, they watch hens lay.

By H. W. Kellick

THERE'S a chicken ranch deep in the heart of Brooklyn where hens lay eggs while you wait.

More than 3,500 white leghorns working on the fowl line in this indoor farm deliver about 130 dozen eggs daily. And they are sold direct to the consumer.

The indoor farm, known as the Weiss-Way Egg Farm, is an idea developed by Murray Weiss. A former farmer and graduate in husbandry of the New Jersey State Agricultural School, Weiss conducts his business on a purely scientific system.

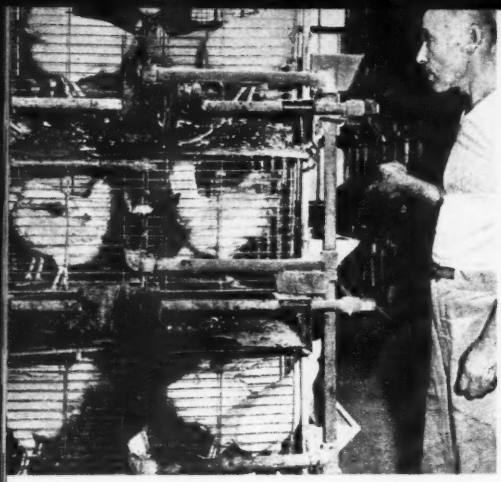
Each chicken is treated as an individual personality. She receives personal attention from Mr. Weiss just as though she were a patient under a doctor's care. Then, when the hen reaches the age of 5½ months —having been bred by Mr. Weiss in his own hatchery—she is housed in one of the 3,500 cubicles that line the indoor farm.

When the hen goes into business, she gets a chart. Mr. Weiss keeps a daily record of her production. If she fails to deliver a minimum of 175 eggs the first year, she is replaced by another chicken and sold for meat at the city markets.

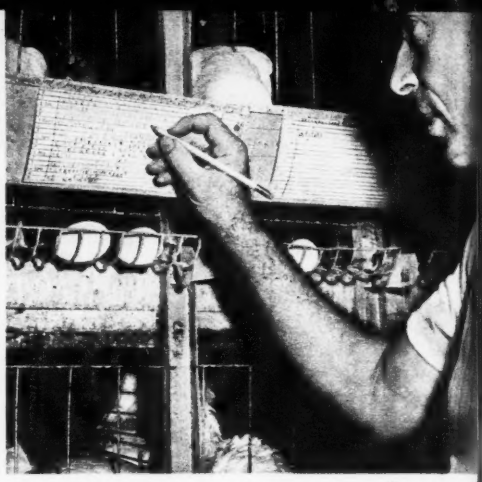
Usually, a hen is in the egg-laying business for about three years. In the second year, her production drops about 20 per cent; more in the third year. Then she, too, is sold for table food.

Customers are constantly amazed at the daily egg production at the indoor farm. Many have seen their first chickens actually laying. Some customers have favorite

On a heavily-traveled road on the outskirts of Brooklyn, the Weiss-Way Egg Farm is located. Here, in the small brick building, Weiss' 3,500 white leghorns make up a real egg assembly line.



Each level has a crank which pulls a scraper which, in turn, removes the droppings that fall through the bottom of the cages which house hens.



On a card attached to each cage is an accurate record of the number of eggs laid by each hen. In this way Weiss knows which fowl to get rid of.

chickens and watch them through a glass wall. Then, Mr. Weiss gathers the eggs in a basket and wraps up the order.

Many customers are surprised to learn that a chicken lays eggs without being mated with a rooster. Weiss constantly has to disillusion his uninformed city folks. "Mating a hen with a rooster is primarily done for hatching," Mr. Weiss tells the curious ones. "And we use one rooster for every 18 hens."

Murray Weiss has been interested in poultry husbandry for 25 years and gained first hand experience on farms in Connecticut, New York and New Jersey.

One day he was talking to a big poultry producer who bemoaned the fact that his profits were small compared to those of the middlemen—the wholesalers, retailers and brokers.

That gave Weiss some food for thought. He called on brokers, wholesalers and retailers and found out the margin of profit each made on eggs before they reached the consumer. The idea of an indoor farm lodged in the back of his head.

Thus, in 1936, armed with $3,000 he had saved as a farm worker, Weiss invaded Brooklyn to try out his idea. He ran into one immediate obstacle—zoning laws.

After a three-month search, however, Weiss found a spot at 15 Fairfield Avenue which was far enough away from thickly populated sections. He rented the building, which he now owns, and started in business in the 20-by-80 foot structure. He built individual cubicles out of pine boards and chicken screening. Then, he bought 600 hens and had a big sign painted "Eggs Laid While You Wait," which he strung across the outside of the building.

People who saw the sign stopped and gaped. Many thought it was a gag, so they wandered into the indoor chicken ranch. Sure enough, chickens were laying eggs. Surprised by the truth of the sign, the doubting-Thomases decided to try the freshly laid eggs. They raved about the quality.

Soon, they were coming back for more, bringing new customers with them.

Word-of-mouth advertising spread throughout Brooklyn. People drove to the egg farm from distant points and placed regular orders with Weiss.

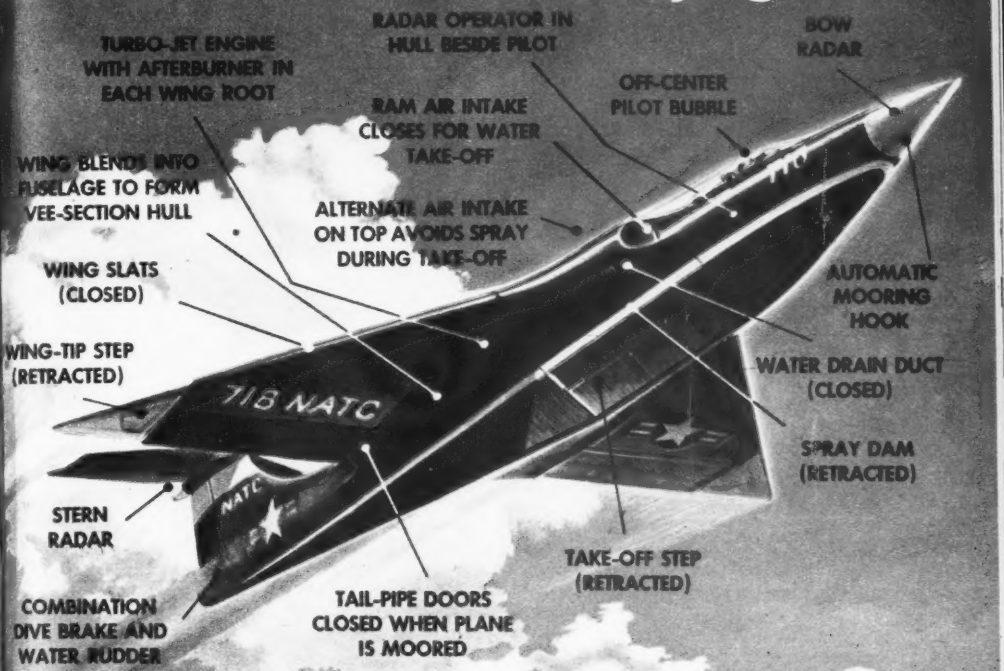
As business boomed, Weiss expanded his plant to a 40-by-100 foot one-story building. He arranged his production factory in tiers three decks high with 100 cubicles on each deck. This not only conserves room but also affords Weiss an opportunity to keep close check on each hen.

This caged method tends to produce fresher eggs than those which are laid on outdoor farms. The reason for this, explains Weiss, is that the normal temperature of a chicken is 106 degrees. When a hen lays an egg outdoors, she generally sits on it for a long time keeping it warm. But, eggs, to be absolutely fresh, must cool off immediately after passage. When a Weiss hen lays an egg indoors, it cools off because it immediately rolls down a chute into a basket.

The age-old theory that white eggs are better than brown is disclaimed by Weiss.

[*Continued on page* 185]

America's First JET Flying Boat



LAST year's flying boat is going the way of the dinosaur. Jet power is the magic wand that has turned the trick. No longer is a high, narrow hull needed for propeller clearance. No more clumsy, wing-tip floats keep the ship from capsizing. The new Skate squats on its broad, stable bottom and rides the swells like a seagull.

Consolidated Vultee's Ernest C. Stout is the magician. In his new design is the smooth blending of the wing roots into the fuselage and the result is a shallow, broad beamed, vee-bottom hull. Engines are contained in the thick wing roots and fuel tanks are in the fuselage. High take-off spray is countered by a retractable spray dam which deflects it downward and intake air is sucked in above the wing until the plane leaves the water. Then ram-air intakes are opened.

Models Eight and Nine of this plane are under secret test. The supersonic model shown here is based on Convair's XF-92A experimental fighter. Navy says, "Water-based jet fighters? We can use 'em!" •

DEVELOPMENT OF BLENDED HULL

FRANK TINSLEY '51

MI Tests the '52 MERCURY

I have it on good authority that Salvador Dali had nothing to do with the styling of the 1952 Mercury. Who actually did do the job is unknown to me but it seems to be the morning-after result of the designer's attending an automobile show and then going home to bed and a king-sized nightmare. The new Mercury's front end reminds me of hash night in Uncle Dopey's Chowder Factory. If you look closely, you will see Buick's old false teeth and its dragon's-eye parking lights (which are not lights at all in this Merc) at the bottom of the grille. Glance up just a bit and you find the upper plate missing but a good facsimile of Howe's famous Cavern. High above this we come to Dali's corner. Here, a broad, fake hole across the hood looks as though some guy misplaced a Cadillac rear fender.

Cadillac started this falsy movement in 1950, with its look-like-but-ain't-ventilated rear fenders. This sort of stuff is okay if it works but why design air traps just for ornamentation? From a purely functional, engineering standpoint, the '52 Mercury has a hell of a looking front end. The rest of it, with

Though material restrictions kept Mercury from getting the brand-new overhead-valve V8 it planned for this year, it's still a pretty fine car.

By Tom McCahill

the exception of the junior Cadillac-type, or short beer rear fenders, is a nice looking automobile. The hardtop unconvertible, from a profile view, has good clean lines and is a match for any other American car on the road. The interior is tops and all the hardware and fittings are in the finest American tradition.

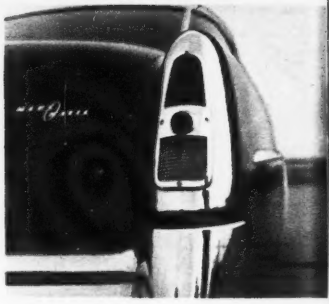
Mercury, like the V8 Ford, expected to come out in 1952 with a brand-new V8 overhead-valve engine. Tooling restrictions, dictated from Washington, nipped this change so that again we have a Mercury with a V8 flat-top engine, as originally introduced back in 1939 but with refinements and a considerable hop-up. This year the Mercury V8 is rated at 125 horsepower as against last year's 112 and the torque has been raised from 206 to 211 foot pounds. This was accomplished by boosting the compression from 6.8 to 7.2, by valving and by a new carburetor.

This power plant is as reliable as the tide and it gets the Mercury over the ground with effortless ease but it is by no means a full powerhouse job for spitting in the eye of Caddies, Chrysler V8's and their ilk. Zero to 60 with overdrive averaged 15.1 seconds, which is fast in anybody's potato race but far from record-breaking stuff.

Mercury made a character switch back in 1948 when the 1949 models came out. When Mercury was first introduced, late in 1938, it was generally conceded to be a super-dooper deluxe Ford. It was known as the Ford Ford would like to build if price and competition didn't enter into the picture. These jobs (even the swoony-looking convertible with real leather upholstery) originally sold for less than today's Henry J. They were luxury items then, when $50 a week was a good executive's salary and automotive writers got paid off in apples. But when the 1949 models were introduced, instead of being big Fords they became little Lincolns under the Lincoln-Mercury banner.

A 1948 Mercury finished fourth in the 2,000-mile Mexican road race of 1951. I had one of these hard-crusted '48s and I reported at the time that a tougher American road car had never been built. That

Profile view of the new hardtop convertible which Mercury calls the Monterey, appeals to MI's Uncle Tom, who says that he can't say the same for the front-end looks of the '52, opposite page.



Radical changes in the styling of this year's Mercury are very apparent in this view of a four-door sedan which Tom holds near the crest of the Ford test track's famous camelback hill climb. Grille has been redesigned, as has the wide radiator ornament, which looks as though it doubles as an airscoop—but doesn't.

Altered tail-lights, directly above, are a new feature on this year's line. As is now customary with most American cars, luggage space is exceptionally large.

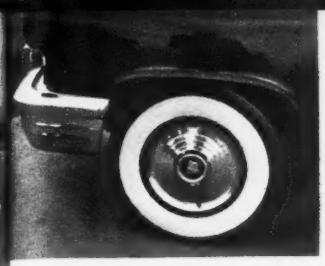
was true. Mine took me coast-to-coast in five days, through four blizzards and over a wild winter, 9,000-foot pass in the Rockies. Actually, I carried over 1,000 pounds of ice under the car right into Tucson, Arizona, and despite this the car gave me many more months of sturdy, steady service. This toughness was just proved again, south of the border, against some of the world's greatest and newest cars, including V8 Chryslers, Caddies, Olds and all the other hot shots.

When Mercury was adopted by the Lincoln division, it had its rowdy clothes and manners changed into a modern version of little Lord Fauntleroy. Today, with a Grand Canyon economy win under its belt and a reliable service reputation, it's quite a car. I must admit it took me a while to get used to the switch. But I guess it was a good idea because they sell an awful lot of them. Today Mercury is rightly rated as a top-flight, medium-priced car which is economical to operate, reliable, big, comfortable and reasonably hot in the performance department.

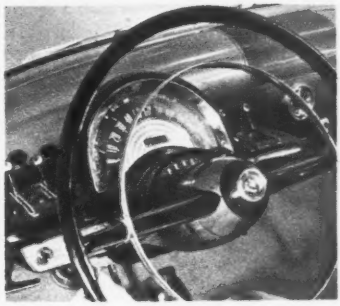
For my test I went to Dearborn where the famous Ford track takes in a considerable part of the landscape. I ran this bucket on the high speed and low speed tracks, over Belgium block roads, up the Alpine-like hill climb and down a super dusty man-made road. This 118-inch wheelbase car feels like a big Cadillac or Lincoln and over the real bumpy stuff you'd swear the car weighed an extra thousand pounds as it irons out the roughest stretch. This is American type luxury transportation at its best.

On the high-speed track at wide open throttle, even through the tough S-bends, this car has a way of instilling confidence that you seldom feel in American cars since they adopted the so-called midship ride and huge tires and said nuts to handling and roadability. The Mercury tucks into the curves without any upper body twist and never once did I get that old tipsy feeling. Naturally, if you tried to corner it behind a Ferrari you'd stand an excellent chance of winding up with a lily in your hand. But by our west side of the Atlantic standards, it was pretty good.

The jobs when equipped with Merc-o-matic are strictly deadheads for my dough. Automatic transmission is a worth-while luxury item if a car is to be driven 90 per cent of the time in slow going, where traffic lights dot the landscape like red-nosed angels on a heavenly spree. In open country, where most of us like to drive, it takes a lot of horsepower to overcome the retarding action of these automotive glue pots. And in this respect Mercury has



Front fender line and treatment are considerably changed from last year's. Chrome slash, on all Ford Motor Company passenger cars this year, is new item too.



Greater driver convenience and safety motivated changes in this year's instrument panel grouping, Mercury engineers say. Tom, top, decides to find out for himself.

none to spare, considering its large size. The 1952 Mercury could easily use more power and in my book it definitely needs it when tied up with a Merc-o-matic transmission.

Mercury, like Lincoln, has its eye on more Grand Canyon wins, which sell a lot of automobiles, so they say. But economy is a tricky thing with a flexible set of standards. Thousands of automobile owners and buyers are under the erroneous impression that a small or underpowered engine is the hot engine in the bank book derby. This is strictly a screwy idea and I'm glad the Nash company proved it the hard way in 1950. At a steady 40 or 50 miles an hour, the little engine is an unbeatable bearcat but if you cruise with the rest of the crowd on, say, the Penn Turnpike at 70, the little squirt is a dead loss, even in the economy department.

At 70 the little pipsqueak power plant is running nearly wide open and drinks gas like the dam had busted. The big, high-performing engine on the other hand is still loafing at 70 and at this speed is getting much better gas mileage than Junior. Before Christmas I drove to Florida with a two-car cavalcade. One car was a Mark VII Jaguar with the big 160-horsepower XK 120 engine; the other car was a pint-size MG. One [*Continued on page* 106]

Sheerline of the new Mercury also represents a switch from the notched side-panel pattern which marked last year's cars.

MI Tests t

New front-end styling is the only big news at Studebaker this year but our Uncle Tom finds that comfort, excellent performance and an honest buck's worth still rate high.

By Tom McCahill

THE big news at Studebaker this year is abandonment of the fighter-plane front in favor of the more conventional shovel-nose proboscis. You will remember that Studebaker set the notch-back pace in 1946, when all other American cars looked like harrassed mackerels in full flight. At that time and on these pages we predicted that before long every manufacturer in the industry would rob, plunder and steal Studebaker's design. And by the feathers on your Aunt Harriet's head, they all did so before another twelve months rolled around.

This was not an over-masterly piece of brain work on the part of your old Uncle Tom. I just realized that the new design which famed Raymond Loewy had cooked up was a sure winner and, knowing what an unmerciful bunch of pirates there are in the automotive industry, I knew a little thing like robbery wouldn't stop them for twenty seconds.

Now, even Tom Edison couldn't invent a light bulb seven days a week. So while the '47 Studebaker was the freshest and most successful automobile design in years, Raymond Loewy couldn't pull a rabbit like that out of the hat every year. When the wolves started snapping at Studebaker's heels, Loewy and his designing cohorts were pressed to keep their lead on the pack.

So 1950 saw Studebaker give birth to the spinner front and 1951 saw the spinner exaggerated to where it resembled a three-headed ice pick built for Paul Bunyan.

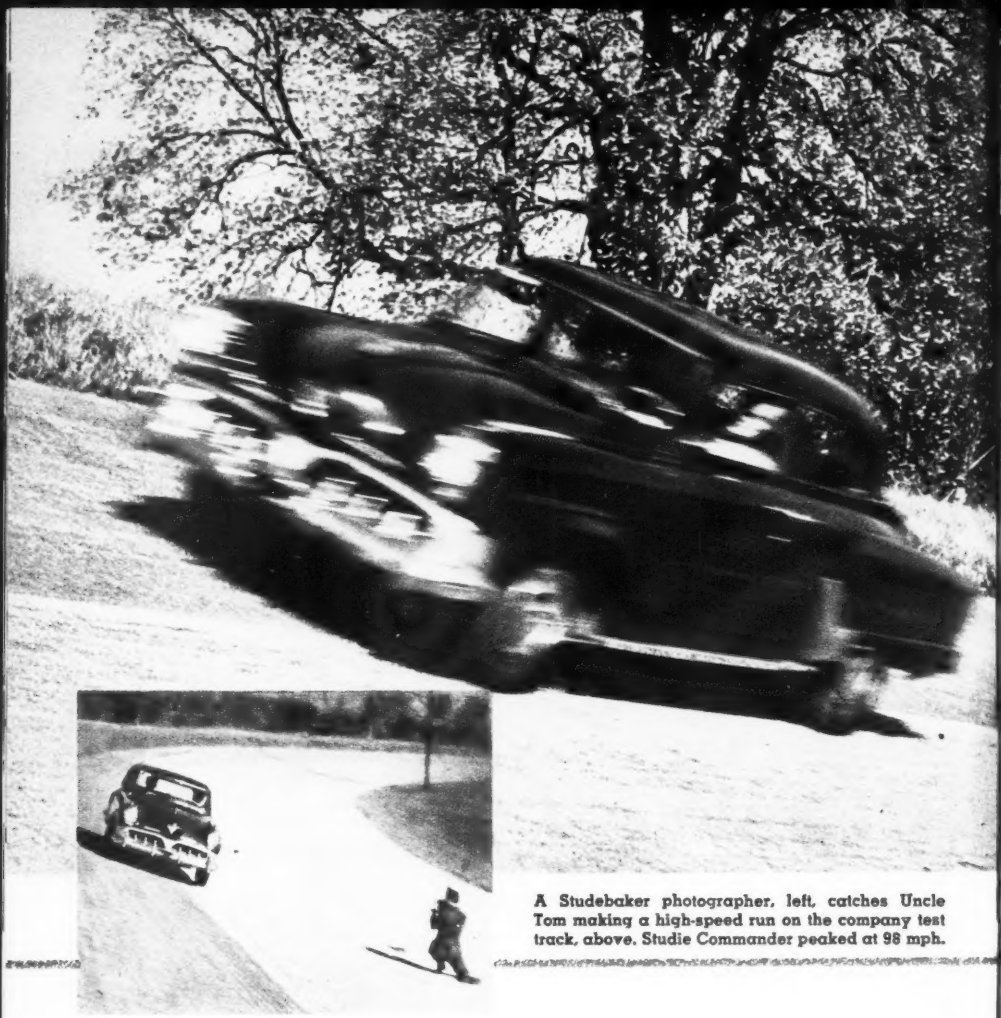
s the '52 STUDEBAKER

Joe the Labrador doesn't mind getting splashed as he paces Boss McCahill in a weatherproofing-test through the water pits at Studie proving ground.

Designer Loewy may have been trying to trap the industry into following him down the spinner beanie trail. But it was no dice. The industry liked his original design in 1946 but they'd have no part of the ice pick. There was only one thing left for Studebaker to do and they did it. In 1952 they have gone right back to the shovel-nose front which is now as standard American as a hot dog.

When Studebaker introduced their new V8 overhead-valve power plant over a year ago, I predicted big things for it. I found it, for its size, as hot as a swimmer with a jelly fish in his trunks and I reported it was a truly great engine. Today I still think so but with a few reservations. Time and again during 1951, Studebaker V8's won the pole position in qualifying for big-time NASCAR stock car races. And time and again these miniature comets led the field for a good part of the race but failed to finish. The fact that a Studebaker V8 made the fastest qualifying time at Detroit and won pole position at the Darlington 500, the two biggest stock car races in 1951, proves they can really perform, especially when you remember they were competing against Hudson Hornets, Chrysler V8's and Cadillacs.

"Look, Joe, no needle nose!" says Uncle Tom as he shows pal Joey the new front end and grille which distinguish this year's Studebakers. New styling is a departure from old new look.



A Studebaker photographer, left, catches Uncle Tom making a high-speed run on the company test track, above. Studie Commander peaked at 98 mph.

But in the races, wot hoppened to the Studies? They broke and went splatt.

Of course, part of this success in qualifying was due to Frank Mundy's expert driving and the late Perry Smith's expert care. Studebaker lost its best friend when Perry Smith was killed when his plane crashed on a mercy mission in December. Perry, a Columbia, South Carolina, dealer, was a great sportsman and carried the Studebaker banner to every part of the country where stock cars squared off against each other.

But anyway, here's the real pitch on why the Studebakers didn't walk off with a barrel of first prizes. Under the stress of prolonged high speed running, cam trouble developed and this caused valve failure. When I asked a Studebaker official point-blank for an explanation, instead of trying to duck he answered, "Material failure." He quickly added, "I think we have it licked now" and I think he may be right because in one of the last big NASCAR races of the year in Mobile, Alabama, Frank Mundy's Studebaker not only won the post position but this time shot across the finish in first place against some of the hottest cars and drivers in the country.

The Studebaker V8 is a great engine but it suffered some at first from growing pains and perhaps a bit from the Korean situation, which caused the quality of available metal to drop. This car will still zoom to 60 in less than 13 seconds with overdrive and has a top speed of 98-plus with this

O. K. Butzbach, chief engineer at the big Studebaker proving grounds, seems to be telling Tom and Joe something interesting. The new Commander looks interesting, too.

same unit. With the automatic transmission the times are quite a bit slower, zero to 60 taking over 16 seconds and top speed being about 96 on a windless, dry, level pavement.

The Studebaker Champion also has adopted the shovel-nose look but remains virtually the same in every other respect, which is all right. The Champion has a 6-cylinder, L-head engine that develops 85 horsepower, capable of getting it over the ground at about 84 mph tops. To the V8 line, which includes the regular Commander and larger wheelbase Land Cruiser, will be added for the first time Raymond Loewy's version of the unconvertible convertible. Aside from this and the new dentures, the 1952 Studebakers look pretty much the same as they did a year ago.

For my test, Bill Ayres, public relations chief, drove me out to the huge company proving grounds just west of South Bend. The most interesting part of the Studebaker test track to me is the fact that in the center of it there is a huge marsh, just crammed with ducks and geese. I dropped some hints about letting Joe and me get a crack at them but it was no go. In the first place, they told me, it was a federal bird sanctuary and in the second place, the marsh was crawling with swamp rattlers. The latter reason kept Joe and myself legal.

My first [*Continued on page* 106]

Although priced in the medium cost range, the Studebaker line offers much in dollar value, Tom feels. Upholstery is typical of fine workmanship.

Styling of the rear end of the Studebakers is not much changed from last year's. Aside from the front, overall appearance is pretty much the same.

MECHANIX ILLUSTRATED

PIN-UP CAR

1939 B.M.W. TYPE 328

Owner: Wm. S. Kemp, Fitchburg, Mass. Original cost: $3,500. Engine: six-cylinder, overhead valves, 120-cubic inch displacement, hemispherical combustion chambers, three carburetors. Compression ratio is 7½:1. Weight: 1,700 pounds. Top speed: 100 mph. Chassis is stee tubing.

Combo Scooter, three wheels, is powered by a 4.5 horse power motor and has a top speed of 40 mph. In case of rain a plastic cover contained in a handbag is inflated like a balloon and clipped to the top. It was recently shown at International Bicycle exhibition, Frankfurt, Germany.

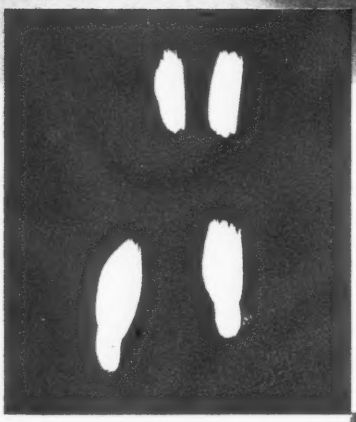
WIN $25

Send in a sharp, glossy photo of a snazzy car, old-timer or new, posed as at left with owner or a pretty gal. Include self-addressed, stamped envelope (just in case) and all vital statistics about car and owner. Mail to Pin-Up Editor, MECHANIX ILLUSTRATED, 67 West 44 Street, New York 18, N. Y.

NEW for the ROAD

Folding bike called piccolo can be stowed in almost any corner, is carried easily as in photo at right. It weighs about 70 pounds, has a 38 cc. Victoria engine. Bike folds in center as shown. Manufacturer claims its fuel consumption is 100 miles per gallon. Cost is about $94 U. S.

A big snowshoe, weighing three to five pounds, is quite a trophy. He derives his name from his huge hind feet which drive him through the snow.



You can hunt rabbits on dry ground but it's more fun in the snow, as at right. In photo at right center, a beagle has picked up a track. A proud hunter and pup admire two potential hasenpfeffers, far right.

HUNTING SNOWSHOES

The voice of a beagle hot on the trail of a big bunny is music to the ears of thousands of hunters.

By Raymond R. Camp
Rod and Gun Editor, N. Y. Times

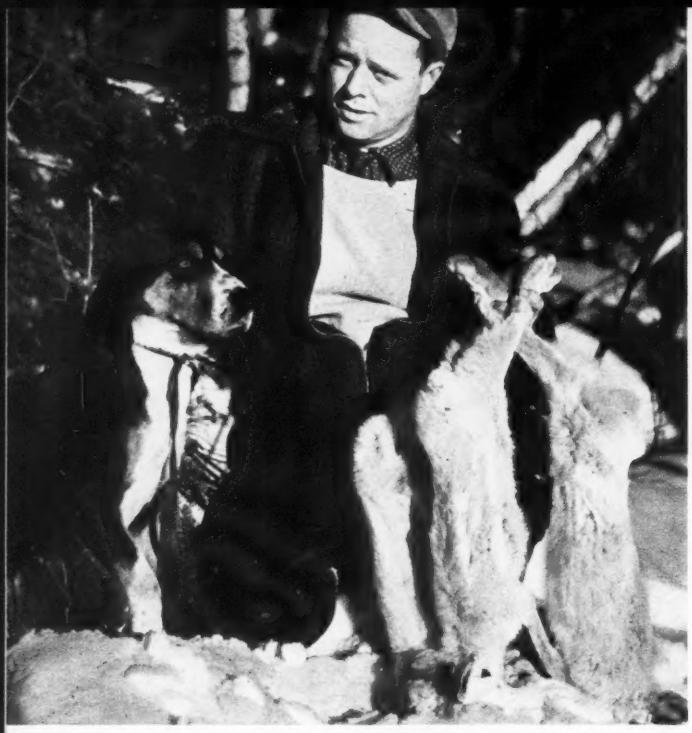
FOR every quail, pheasant, grouse and woodcock hunter in our uplands there are over a thousand who tramp the thickets after bunnies. There are an awful lot of rabbit hunters—and rabbits. But the remarkable fact is that instead of diminishing in numbers, both seem to be increasing.

Millions of enthusiastic bird hunters cut their teeth on rabbit hunting and to these men the sport will always have an appeal if only because it carries them back to their youth when hunting and life were less complicated. Some of the lordly bird hunters are inclined to look down their noses at both the rabbit and its hunter. They describe the sport as "basic" hunting. But it's the very elementary quality of it that offers its greatest appeal. You never know just what a bird will do once it is flushed. But you do know that a rabbit, pursued by the hound, will always come back to the point where it was jumped. In the case of the snowshoe rabbit (varying hare) it may lead the dogs over a lot of country before returning to its starting point. But if the hound keeps driving, return it will.

Those who have never hunted bunnies over a pair of good beagles and felt their blood stir at the music tossed back as these little hounds drive their quarry, have missed one of the most interesting forms of hunting. And the bunnies have another advantage that the more exotic forms of upland game don't possess. It's often necessary to drive several hundred miles to enjoy a few days of really good bird shooting but the man with a rabbit hound can find game practically in his own back yard. The cottontail will thrive and multiply in covers where game birds would starve.

I have a friend who has a passion for assorted rabbit hounds. He never seems to have less than a half dozen of them overrunning his house and usually their number includes several crossbreeds as well as registered hounds. Not long ago he called me to report a new acquisition and to insist that I go along with him and see how a dog "ought to work" snowshoe rabbits. We met at the crack of dawn. A 75-mile drive faced us. He suggested I leave my car and ride with him.

In the back seat of his car was a sleepy looking hound somewhat resembling a



Big mountain snowshoes, sometimes called ridge-runners, can tire a small dog too quickly. For these, larger dogs of the foxhound type are used.

beagle in size, with color and appearance of an old New England coonhound. After about ten or fifteen minutes the hound threw off its lethargy and began systematically tearing the upholstery from the back seat. My friend seemed completely oblivious to this destruction and since it was his car I made no comment.

Arriving at our destination we found a couple of inches of fresh snow underfoot. Conditions seemed perfect—provided there were snowshoe rabbits. The hound soon banished any fears on this score. Released from the car he immediately took off for a nearby thicket and it seemed only a matter of seconds before he began yelping and screaming as though someone were beating him to death.

"Ever hear a mouth like that?" my friend beamed. "And wait until you see him drive that big-foot."

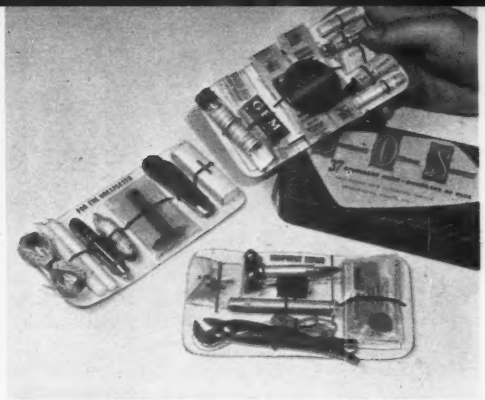
Pursued by this welter of sound, the snowshoe must have thought a dozen hounds were on his tail. He took off for the hills with no delay, the hound in full cry on his trail. As far as we could tell from the sound, the dog never faltered although the snowshoe made several circles and loops in an effort to escape his pursuer. In less than five minutes the rabbit headed back to his starting point and when my friend's gun cracked I knew that the race was over.

During the morning that hound jumped and ran seven snowshoes and he seemed as fresh and eager on the seventh as he was on the first. As for his mouth, it was as loud and shrill as it was in the beginning. After the sixth rabbit was in the bag (one was bowled over by another hunter) my friend decided we had had enough for one day.

On the return trip I admitted that I had never hunted over a better snowshoe dog. But since the hound was taking up where he had left off on the upholstery, I suggested that he would *have* to be good to compensate for the damage he did.

"You know what I'm going to do?" my friend replied. "Next week I'm going to buy a new car and I'm going to let him tear hell out of the upholstery in that one, too. You get a hound like that once in a lifetime."

There is another reason, and an important one, for the popularity of rabbit hunting. Bird seasons, especially in the East, have shrunken considerably in length in recent years as a result of increased hunting pressure and reduced game-bird populations. In some states you get less than a week of [*Continued on page* 166]



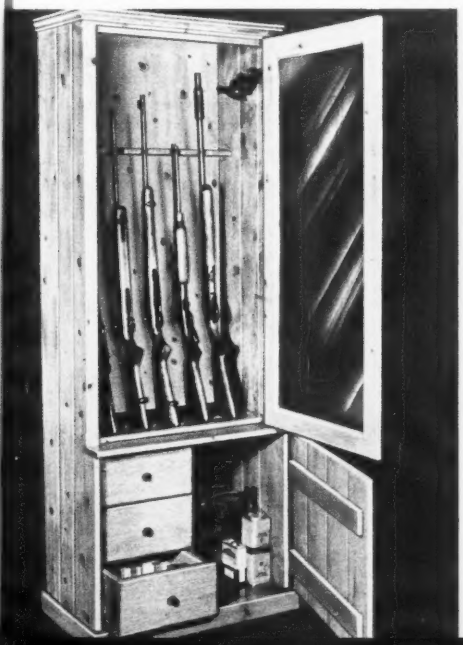
Wallet-Pak contains two decks of washable, all-plastic playing cards which won't warp, chip or fray and will withstand the toughest camping trip. In a rotary rub-tester, above, they outlasted 100 ordinary cards. Northbrook Card Co., Northbrook, Ill.

SOS Kit weighing only 11 ounces contains 37 items to provide for any emergency that might confront the sportsman. It has first-aid supplies, repair equipment, flashlight, lighter fluid, candle, boot patch, hammer, etc. Kardis Co., Inc., Chrysler Building, N. Y. C.

NEW for the SPORTSMAN

Build-It-Yourself gun cabinet is sold as a prefabricated unit, can be assembled in a couple of hours. Made of knotty pine it is 6½ ft. high, over 2 ft. wide, weighs 98 lbs. Both doors have strong cylinder locks. Roberts Industries, Brandford, Conn.

Basketball Player Scoreboard made for Bradley University by Merle Eagle, left, shows field goals, free throws, total points and personal fouls for each player. When a figure is changed by toggle switch on control panel, red light flashes.

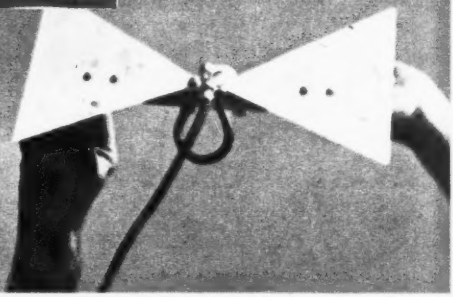


Radiant Heater is portable and almost foolproof. Its infra-red glass, heated to 300 degrees, will not sear when touched. Paper and fumes can contact it safely. Radiant Glass Appliance, Norwich, N. Y.

Tub-Caulk: waterproofs shower stalls, caulks bathtubs and sinks, fills in cracks between window frames and tile or plaster. It is plastic, won't dry out, shrink or crumble. Miracle Adhesives, 53rd St., N. Y. C.

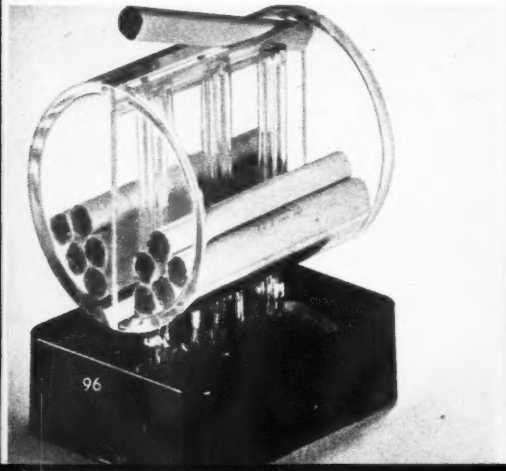
NEW for the HOME

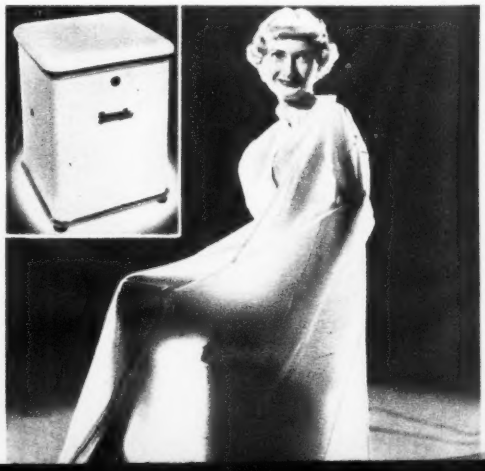
Bow-Tie Antenna will be the vogue when the Federal Communications Commission licenses an additional 1,400 ultra-high frequency television stations, and housetops will take on a new look. Design is said to be very efficient. Close-up is shown in right photo.



Cig-Barrel hands you cigarettes one-by-one when you lift the barrel and then release it. It's made of plastic with an ebonite base, and takes a full pack. Green-Moore, Lexington Ave., Somerville, Mass.

Home Steam Bath is a white enamel steam stool, inset, 17 inches high and 13½ inches square. Vinyl plastic robe is stored in stool's cover. One pint of water lasts 30 min. Home Accessories, Jacksonville, Ill.





HERE IT IS!

MI's OLD AUTOMOBILE *Contest*

FIRST PRIZE
'52 NASH Rambler Station Wagon...

SECOND PRIZE $200.00

THIRD PRIZE $100.00

FOURTH PRIZE $50.00

FIFTH PRIZE $25.00

SIXTH PRIZE $25.00

SEVENTH PRIZE $25.00

RULES

1. On the next two pages you will see photographs, numbered 1 to 12, of a dozen old-time American automobiles. Beside each number are three names, one of which is the correct name of the car pictured directly above. Your task is to identify each automobile by its correct name.

2. Study the pictures. Then, on the Official Entry Blank on page 99, draw a circle around the name which you believe is the correct one for each of the twelve correspondingly-numbered photographs. Circle one, and only one, name after each number. Print your own name and address in the spaces provided.

3. Now, on one side of a separate sheet of paper, write in 50 words or less your suggestion for "An Improvement I Would Like To See Made In American Automobiles." Print your name and address in the upper right-hand corner of the sheet.

4. Mail the completed Official Entry Blank, together with the separate sheet containing your statement, to:

Old Car Contest
MECHANIX ILLUSTRATED
67 West 44th Street
New York 18, New York

To be eligible, your entry must be postmarked not later than midnight, April 1, 1952.

5. You may submit as many entries as you like. But each entry must be submitted on an Official Entry Blank taken from the March 1952 issue of MECHANIX ILLUSTRATED.

6. Prizes will be awarded on the basis of correct identification of the greatest number of automobiles. In case of ties, tying entries will be judged for originality of thought and expression contained in the entrant's statement "An Improvement I Would Like To See Made In American Automobiles."

7. Contest is open to any resident of continental North America except employees of Fawcett Publications, Inc., its wholesale distributors and advertising agencies, and their employees and families. Contest is subject to all Federal, state and local regulations. All entries become the property of Fawcett Publications, Inc., and no entries will be returned. The editors of MECHANIX ILLUSTRATED are the judges of this contest and their decision shall be final.

8. Winners will be notified by mail, telephone or telegraph. Names of winners will be published in MECHANIX ILLUSTRATED.

EIGHTH PRIZE $25.00

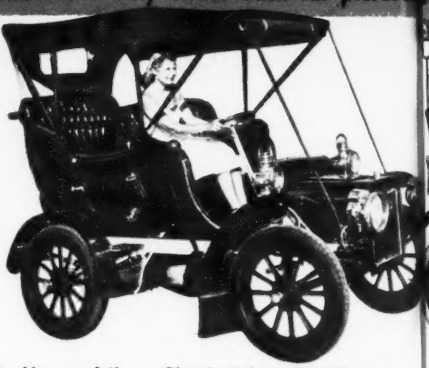
NINTH PRIZE $25.00

TENTH PRIZE $25.00

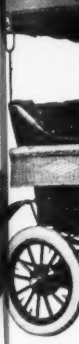
TURN THE PAGE

MI's Old Car Contest . . . INSTRUCTIONS: Circle one name only under each car picture, then co

1. Autocar • Rauch & Lang Electric • Velie



2. Hupmobile • Chadwick • Cadillac



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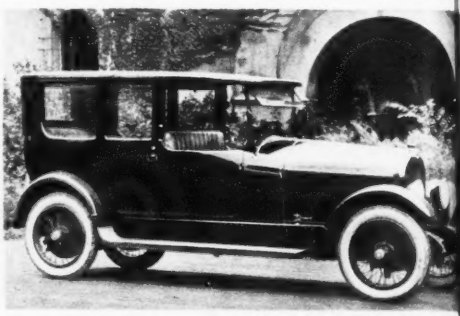
5. Mitchell • Matheson • Buick

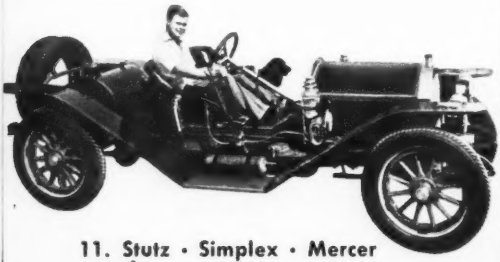


6. Moon • Marmon • Duesenberg

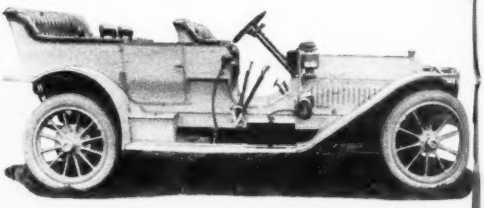
7.

9. White Steamer •
Maxwell • Stanley Steamer

10. Franklin • Chandler • Chevrolet



11. Stutz • Simplex • Mercer

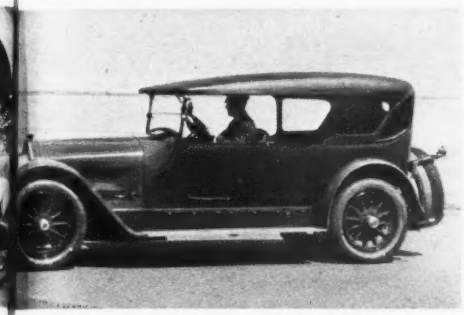


12. Thomas • Premier • Oldsmobile

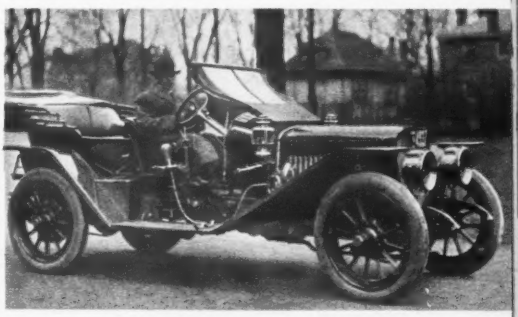
picture then copy your selections on the Official Entry Blank.

3. Overland • Rambler • Peerless

4. Oakland • Hudson • Ford



7. Locomobile • Packard • Winton



8. Lozier • Chalmers • Reo

OFFICIAL ENTRY BLANK

Mail to: Old Car Contest
MECHANIX ILLUSTRATED • 67 West 44th Street, New York 18, N. Y.

My selections are *(circle one name after each number)*:

1. Autocar • Rauch & Lang Electric • Velie
2. Hupmobile • Chadwick • Cadillac
3. Overland • Rambler • Peerless
4. Oakland • Hudson • Ford
5. Mitchell • Matheson • Buick
6. Moon • Marmon • Duesenberg
7. Locomobile • Packard • Winton
8. Lozier • Chalmers • Reo
9. White Steamer • Maxwell • Stanley Steamer
10. Franklin • Chandler • Chevrolet
11. Stutz • Simplex • Mercer
12. Thomas • Premier • Oldsmobile

On a separate sheet of paper I enclose my suggestion (in 50 words or less) for "An Improvement I Would Like To See Made In American Automobiles."

Name.....

Street Address.....

City or Town..... State.....

Entry must be postmarked not later than midnight April 1, 1952

Zoo's Who

Lucky rare bird is the American bald eagle—he's protected by an act of the U. S. Congress.

Ever heard of a quetzal, a bandicoot, a tuatara? Well, they're in the animal Social Register—and on anyone's list of the rarest species in the world.

By West F. Peterson

FISHERMEN plying their trade on a trawler off the coast of South Africa got the surprise of their lives one day. Derricking up their net from a depth of 40 fathoms, they found the usual amount of ordinary-run species when it came to the surface. But flopping around amidst these fish was something that looked exactly like a prehistoric monster.

This weird catch was five feet long and weighed 127 pounds. It had the physiognomy of a creature seen only in nightmares —the body was covered with armor plate made up of large, bony, enamel-covered scales. Protruding from the sides were limb-like fins which operated as paddles. There were two separate dorsal fins and two tails.

Suspecting a hoax, scientists came all the way from London to examine the monster. But they were as surprised as the fishermen. One of them said, "This is perhaps the most amazing event in the realm of natural history in the twentieth century."

The two-tailed denizen of the deep, said the scientists, was a fish believed to have been extinct for 50 million years. Its name was the coelacanth and its existence had previously been known only through the reconstruction of fossilized remains.

Without doubt there are other prehistoric monsters cruising today in the mysterious ocean depths. They are prime examples of Nature's tendency to refuse to allow any of its species to disappear completely.

What fish, animals, reptiles and birds could be included in a list of the world's rarest species—a sort of Zoo's Who of the creatures of the world? Put this question to 100 scientists and you'd get 100 different answers. However, there are many nominations that can be made without fear of dispute.

Take another oldster, for instance—this time in the reptile family. The tuatara.

Found only on a few rocky islets off the coast of New Zealand, where its ever-

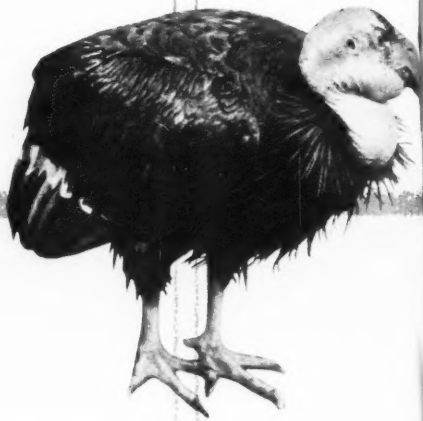
Offspring of a lion father and a tiger mother, this liger is one of world's rarest creatures.

These round-nosed tapirs are pretty scarce, but the hairy tapir, a close relative of theirs from South America, is even more difficult to find.

Ivory-billed woodpeckers have a 1,300 acre sanctuary set aside for them in Florida but no more than two or three have been spotted in recent years.

This is the actual size of the Lessons emerald humming bird, probably the smallest bird in the world.

America's great auk learned to dive but never managed to learn how to fly. And now, he's extinct.



California condor, a member of the vulture family, is one of only 60 left. Females lay one egg in two years.

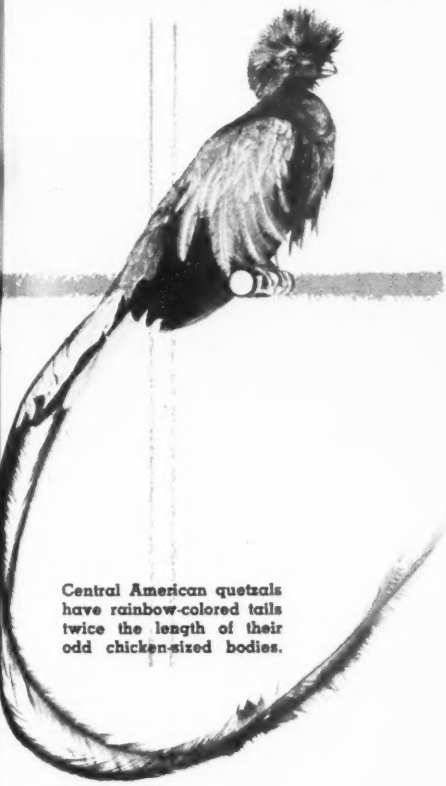
decreasing population is protected by law, the tuatara is a distant cousin of the dinosaur and ichthyosaur. Its family tree dates back 180 million years to the Carboniferous Era.

This sluggish, lizard-like creature averages two feet in length and is equipped with three eyes, one of which is grown over with a thin layer of skin. Its spine is surmounted by a series of bony projections. Probably because its brain is only the size of a pea, the tuatara sleeps most of the time.

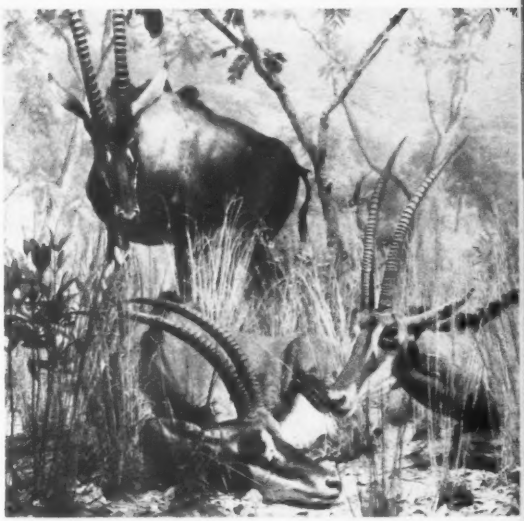
This oddity exists on a diet of snails and insects and it can lie at the bottom of a pool for many hours without breathing. Just how papa and mama reproduce isn't known, but mama does lay eggs once in a while. Not often enough, though—and [*Continued on page* 105]

Australia's bandicoot looks like a cross between a rat and a rabbit. It's facing extinction because it must compete for food with sheep and rabbits.

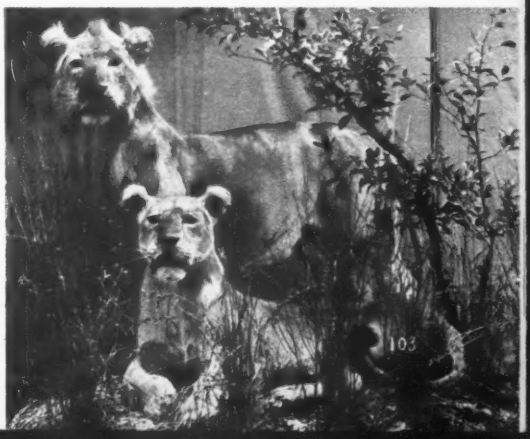
Another addition to the Zoo's Who of the world's rarest creatures is this four-horned antelope of India. Brow horns are merely knobs, however.



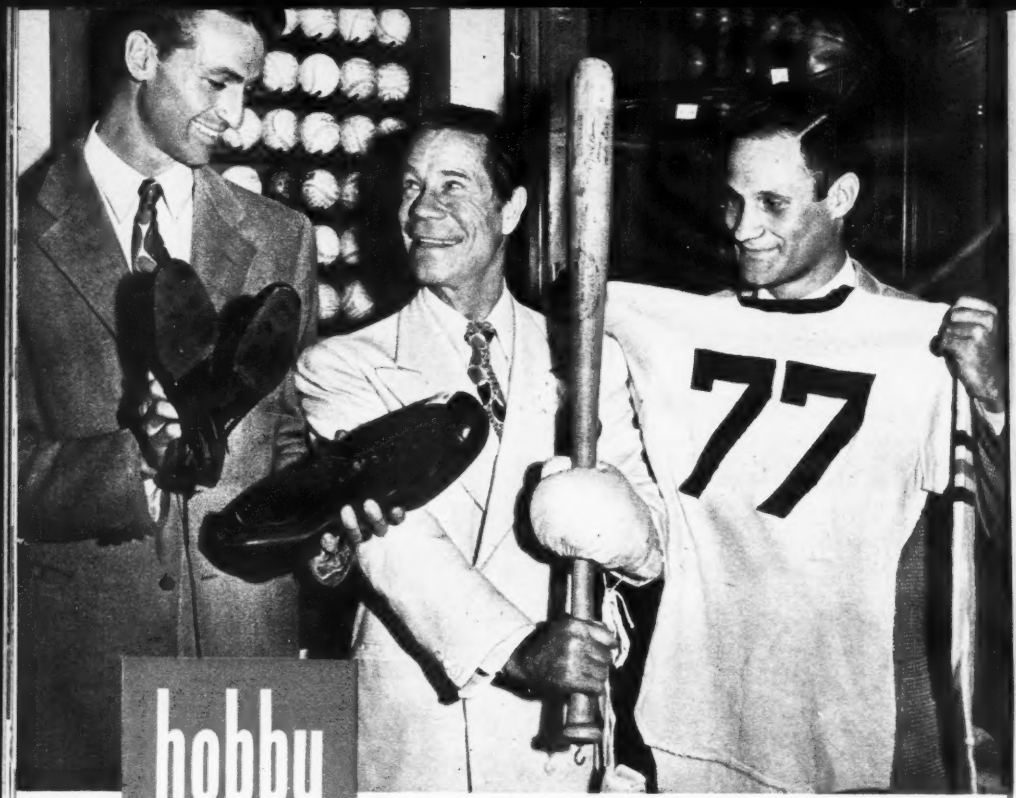
Central American quetzals have rainbow-colored tails twice the length of their odd chicken-sized bodies.



According to Dr. Antoon de Vos in a report to the UN, there are no more than 500 giant sable antelopes left to roam the jungles of Africa.



Formerly widespread in India, the Asiatic lion is now confined to the 400-square-mile Gir Forest where less than 200 of them still remain alive.



hobby HALL OF FAME

Joe holds the bat with which Babe Ruth set the record of 60 home runs during the 1931 season. Football jersey was Red Grange's.

Joe E. Brown: SPORTS MEMENTO-IST

WHO has more athletic trophies than any other person in the country? "I have," says Joe E. Brown, famous comedian. And he may have, at that. He has collected over 2,000 items, representing practically every sport. There are 250 baseballs alone. Gradually his hobby has grown too large for his home and recently he turned everything over to a Joe E. Brown Trophy Room at the University of California. His most cherished memento is an over-the-fence baseball which won a game played before King George in London in 1914. It was the King's first view of the great American sport and in honor of the occasion he signed the ball, "George Rex." •

Trophy room in Kerchkhoff Hall at UCLA which now houses his collection. Joe likes baseball best.

Zoo's Who

[*Continued from page* 102]

that's why the tuatara faces extinction.

A similar failure to produce sufficient offspring is a principal reason why, on the other side of the globe, the California condor has become a genuine rarity.

A huge bird noted for its soaring flight and a member of the vulture family, the condor was threatened with a passport to oblivion. Ornithologists feared it would vanish as completely from the American scene as the Carolina paroquet, the passenger pigeon and the great auk. A refuge now has been established in the Los Padres National Forest in California, however, and the prospect is more hopeful.

Once fairly plentiful along the Pacific Coast, condors fell victim to advancing civilization until today there are only about 60 of them left. They live in wild mountain country and are so allergic to humans that the mere appearance of a man in their terrain will keep them away from their nests for 24 hours or more.

This is serious business because Mr. and Mrs. Condor nest just once every two years and then produce only a single egg. It requires more than a year for the parents to raise a chick to the stage where it can fend for itself.

But, American conservationists are worried about several bird species in addition to the California condor. Of the 51 types of woodpeckers in the United States, the ivory-billed is the largest (a little larger than a crow) and the rarest. It may, indeed, be called the rarest bird in the world.

Asked recently how many ivory-bills were left, a top ornithologist shrugged and said, "Maybe two or three, maybe half a dozen or more—frankly, nobody knows."

Certainly those which do remain are somewhere in the wilds of the 1,300-acre sanctuary set aside for them along the Apalachicola River in northwest Florida. A member of the National Audubon Society spotted a pair of them there in 1950. For two or three years prior to that, no ivory-bills had been seen and it was feared they were extinct.

A close relative of the ivory-bill, the pileated woodpecker, also is a scarce breed. This gawky, tailless bird lives deep in the woods in various parts of the country. It totes a bill strong enough to splinter oak and one peck on the skull has been known to knock a man unconscious.

The population of the big, white, beautiful whooping cranes which were so plentiful a century ago now has diminished to an estimated three dozen. In the winter, when most of them congregate at the Aransas National Wildlife Refuge in Texas, they can be protected. But they spend the summers at some breeding grounds far north in Canada, as yet unfound, and both there and during their migrations they are on their own.

The whooper, so called because of his wild, resonant cry, is definitely a candidate for the hypothetical collection of Nature's rarest creatures.

Also nominated are the trumpeter swan (some 400 survivors by the latest count); the wild nene, a species of goose close to extinction; the Everglade kite, inhabitant of Florida marshlands; and the bird which is America's symbol, the bald eagle, for whose preservation there has been a great deal of clamor in recent years. The latter has the distinction of being protected by an act of Congress.

A freak of nature and a definite rarity is the albino robin. This bird, described as looking like a puff of snow, is all white and has pink eyes. It is hatched in a nest in which all the other fledglings have normal coloration and markings.

On the average, only two or three albino robins are sighted each year in the United States. One was most recently spotted in Kentucky in the spring of 1950.

More plentiful than the all-white robins, yet dangerously diminished in number, are the small birds similar to swallows known as Leach's petrels and also as Mother Carey's Chickens. These are sighted far out at sea and it is believed that they come in to land on the northern Atlantic coast only during the nesting season.

Among other rare birds which live on or near the ocean are the reddish egrets and the Aleutian terns. The reddish egrets were slaughtered by the thousands in the '90s, when their plumes were in great demand as decorations for women's headgear. They never staged a comeback but occasionally they are sighted on the coasts of Texas and Florida.

The Aleutian terns are natives of Alaska. Never very plentiful, they may now be completely extinct, in the opinion of ornithologists. At least recent surveys failed to locate any.

Most varieties of deer seem to be holding their own and may even be on the increase in some parts of the United States. But the Key deer—so-called because they used to roam over all the Florida Keys—have been so decimated that they can now qualify for the rarity zoo.

These diminutive animals, favorite mark of poachers and illegal hunters, may have better

[*Continued on page* 181]

MI Tests '52 Mercury

[*Continued from page* 85]

day when we were running at 70 or better for several hours, the big Jag averaged 19 miles to a gallon and the MG 17. The Jag was loafing and the MG was really working, thus eating up more gas.

In the 1950 economy run, the Nash Ambassador got better mileage than the much smaller Nash Statesman because an average speed of 41 miles an hour was required and this meant doing 60 to 70 mph for part of the time. At these speeds the little Nash engine used more gas than the big car. Like that famous fiddle player Einstein might say, "It's all relative." Economy and size of engine depend a great deal on the speeds at which the car is to be run, the altitude and many other factors.

In summing up, the 1952 Mercury is a good automobile that I can highly recommend if it meets your automotive needs. But I'd advise meeting it first from behind. That front end might scare you if you weren't expecting it. •

SPECIFICATIONS

MODEL TESTED:
1952 Mercury hardtop convertible

ENGINE:
8 cylinder, V-type; bore 3.188 inches, stroke 4 inches; maximum torque 211 foot pounds @ 2000 rpm; brake horsepower 125 @ 3600 rpm; piston displacement 255 cubic inches; compression ratio 7.2 to 1

DIMENSIONS:
Wheelbase 118 inches; overall length 202 inches; tread 58 inches front, 56 rear; width 73½ inches; height 62½ inches; weight 3,689 pounds; standard tire size 7.10x15; gas tank 20 gals

PERFORMANCE:
0 to 30 mph, 4.7 seconds
0 to 50 mph, 10.6 seconds
0 to 60 mph, 15.1 seconds
0 to 70 mph, 21.5 seconds
Half-mile from standing start, 33.2 seconds
Top speed, 90-92 mph

SPEEDOMETER ERROR:
At 60 mph on speedometer, actual speed 58.41 mph

MI Tests '52 Studebaker

[*Continued from page* 89]

introduction to Studebaker came many years ago when I bought a second-hand 1921 Studebaker light six touring car in Mamaroneck for $150. Walter Chrysler was a big wheel at Studebaker in those days and this little mouse's engine was almost identical with the Chrysler 70 which Chrysler introduced in 1924. When this clinker of mine finally collapsed a piston I closed the valves, removed the piston remains and rod, and for many months thereafter owned the only five-cylinder Studebaker in the United States.

In summing up, I would like to say—as I have said before—that the Studebaker Corporation is one organization with real honor in the automobile business. For years they have been giving the buyer a genuine dollar's worth. When you consider that the Studebaker V8 Commander is right in the bottom of the medium-priced bracket, just a fraction above the lowest priced cars, you have to concede that here is a car that can't be passed up without a second glance. •

SPECIFICATIONS

MODEL TESTED:
1952 Studebaker Commander four-door sedan (with overdrive)

ENGINE:
8 cylinder, OHV; bore 3⅜ inches, stroke 3¼ inches; maximum torque 190 foot pounds @ 2000 rpm; brake horsepower 120 @ 4000 rpm; piston displacement 232 cubic inches; compression ratio 7 to 1

DIMENSIONS:
Wheelbase 115 inches; overall length 197½ inches; tread 55½ inches front, 54 rear; width 69½ inches; height 62 inches; weight 3,050 pounds; standard tire size 7.60x15; gas tank 18 gals

PERFORMANCE:
0 to 30 mph, 4.5 seconds
0 to 50 mph, 9.4 seconds
0 to 60 mph, 12.7 seconds
0 to 70 mph, 17.0 seconds
0 to 80 mph, 23.3 seconds
Half-mile from standing start, 31.4 seconds
Top speed, 98 mph

SPEEDOMETER ERROR:
At 60 mph on speedometer, actual speed 58.63 mph

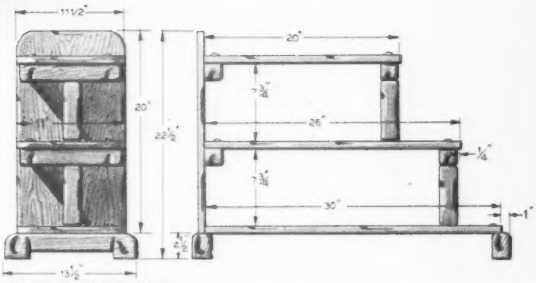
COMING UP NEXT MONTH!

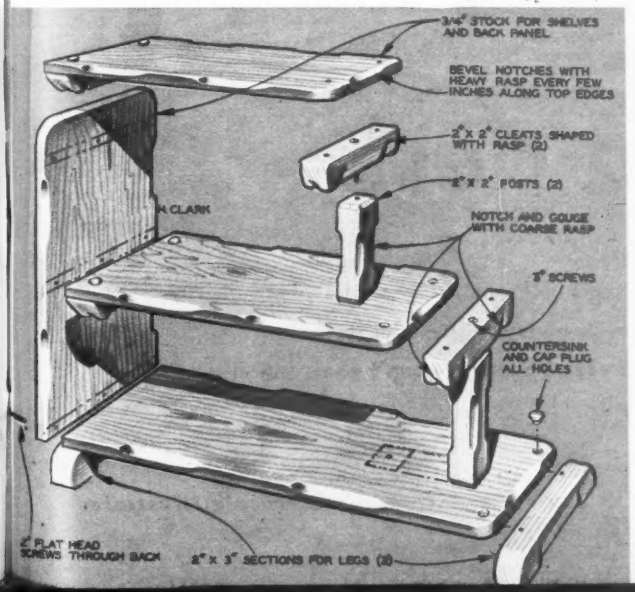
McCahill Tests the Sensational New Ford 6
Read It In April MECHANIX ILLUSTRATED
On Sale About March 19

crafts and hobbies...

Monterey End Table

You'll probably be able to find most of the lumber needed for this project in your own scrap box. The shelves are attached with countersunk screws plugged with ¾-in. dowels which are cut to simulate the old-fashioned pegged method of construction.





BUILT of scrap redwood, fir, or cedar stock and modified two-by-fours, this rugged table is a natural for your den or living room. Round the rear upright and shelf corners with a jig or coping saw. Use a heavy rasp to make the edge gouges.

In finishing, apply a coat of flat cream paint. When dry, brush on some brown oil paint, wiping it off before it gets too dry. This antiquing accentuates the wood's natural grain. Finally, apply a thin coat of spar varnish or shellac.

—*Lyndon Ripley* •

You'll be able to keep all your stationery supplies and filed material in this roomy desk. Notice the well-made dovetail joints in the exposed drawer.

modern desk

The construction of this handsome unit won its youthful builder a top prize in the Ford Motor Company's Industrial Arts Contest. Using his plans and construction data, you can't go wrong.

By George M. Veiga

DESIGNED for appearance as well as endurance, this useful desk will last for a lifetime. Mahogany was used for all exterior surfaces. First I made the eight corner posts from 2-in. stock, then located the mortises in the front units to accept the corresponding drawer rails. Dadoes for the end panels were also cut.

The end and back panels were built up from stock, then rabbeted front and back to fit the grooves in the legs. When the front rails were cut out and tenoned, the runners were made and both the rails and runners were grooved on the inside edge to take the plywood braces. The rails were drilled to accept No. 10 screws.

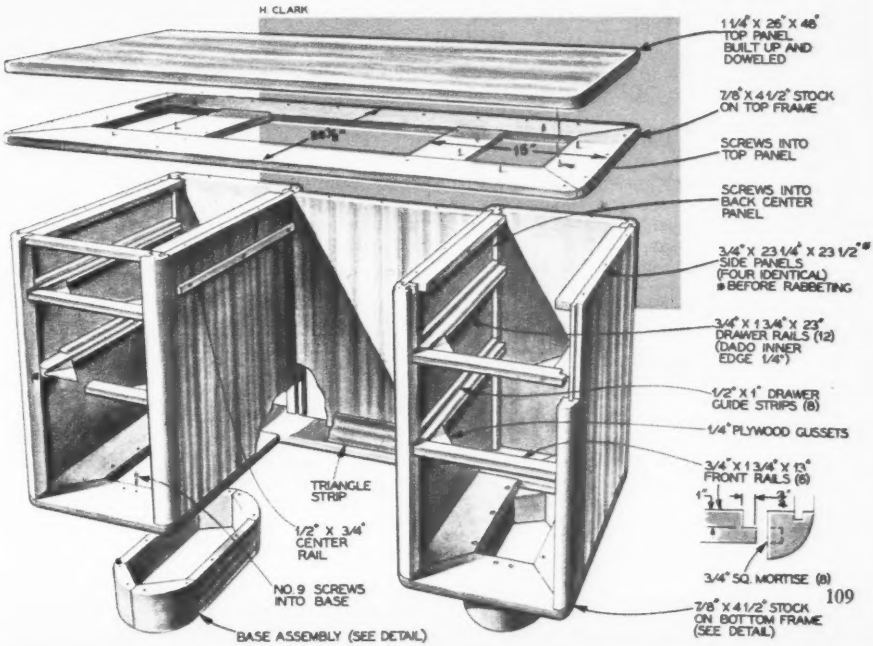
I placed the corner posts on the ends and marked the locations of the runners, then glued and screwed the runners in place.

Before gluing up the end units, I tested them to make sure they fitted perfectly. I carefully glued and clamped the posts to the ends. When these were dry, the complete end units were glued up. I then checked the fronts for squareness in both vertical and horizontal positions. As soon as each unit was square I glued in the triangular plywood gussets, thus joining the rails and runners together as a unit.

Rounding the outside edges of the corner posts was the next process. This was done by hand. The segment lay-out was made on the ends of the legs with a compass, then guide lines were marked down the legs indicating the required chamfer. I took some of the corner off with the jointer then finished with a jack plane, No. 60 garnet cabinet paper, and completed rounding and smoothing with No. 120 garnet finishing paper.

The only hardware used consists of the lock in the middle drawer, brass drawer pulls, and four steel glides placed under each of the bases.

With the end units done, the frames were next. Stock was squared and mitered to fit the end units, then glued and clamp-nailed together. The bottom frame cut to fit the inset of the center back panel. Screw holes had to be located very carefully and drilled with care so the screws would not show around the top edge, since the desk top is inset ¼ in. on all sides. The frames were glued and clamped. All surfaces were



Begin by cutting the corner posts, then fit all the drawer runners and guides in place.

If desired, make dadoes in the drawer sides to accept dividers made of ⅛-in. plywood.

planed to a perfect fit with the frames. Corners were rounded with an electric router, ¼ in. around the top and ⅜ in. around the bottom.

The center back panel had to be hand fitted, planed and sanded before gluing and screwing it in place. The screws were inserted from the inside of the end units, and were quite difficult to install.

When stock was squared for the bases, the segments of the end parts were marked at a 45° angle and cut on the band saw. They were cut for clamp nails and then glued and clamp-nailed together. After this they were band sawed, half round, to a 4-in. radius on the ends, and finally sanded and screwed in place.

In order to get a uniform clearance the drawer fronts were squared slightly oversized—a $\frac{1}{16}$-in. play each way. The drawer sides and fronts were grooved to take the bottoms, and the sides dadoed to fit the backs and partitions.

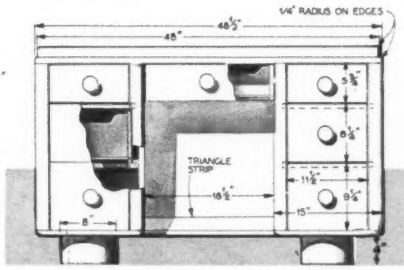
To make the dovetails, I first marked the mortises on the drawer fronts with a scriber using a sheet metal template placed at the center lines of the mortises. A ⅜ in. mortising chisel was employed to remove the center and a hand chisel finished the job. The drawer sides had to be numbered to match their respective fronts. A sharp band saw was used to cut out the tails, taking great care to cut to the scribed lines.

The drawers were assembled by gluing the dovetail joints, gluing and nailing at the back dado, and nailing through the bottom into the back.

Drawer guides were glued and bradded to the runners and the center drawer runners screwed in place. The plywood drawer partitions were cut and inserted. A pencil tray was made by clamping guide sticks at an angle on the circular saw table and raising the saw $\frac{1}{16}$ in. at a time, thus cutting out the rounded bottom of the tray. It was sanded, partitions were put into it, then it was glued into the drawer.

Selected ribbon-grained stock was chosen for the top. I jointed the face sides and edges before planing the stock. I carefully doweled and glued it up, hand-planed the bottom surface, and cut it to size. All exposed surfaces of the desk were then smooth planed.

The finishing process was started by staining with Antique Mahogany No. 40 medium water stain. I shellacked all inside surfaces, runners and drawer parts. They were later waxed to achieve smooth running. For the outside finish I applied four coats of varnish. •



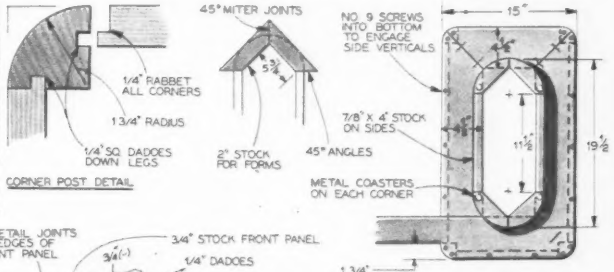
Tilted rear view shows how the middle back panel is set between rounded corner posts.

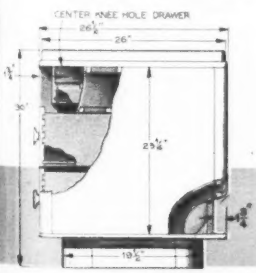
This carefully done finishing job is comparable to that found on commercial furniture.

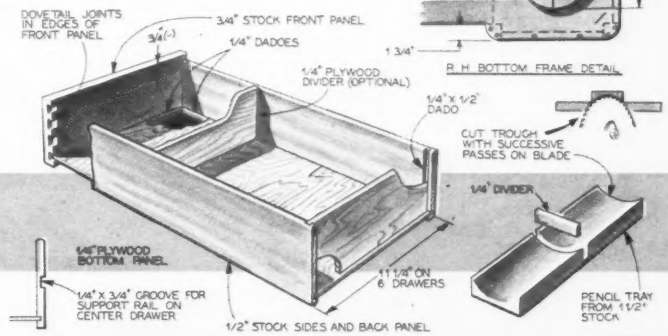
BILL OF MATERIALS

Mahogany was used for all exposed parts, plywood for drawer bottoms.
Corner Posts (8), 1¾x1¼x23¼ in.
Ends (4), ¾x23½ in. wide x 23¼ in. long.
Backs (2), ¾x12x23¼ in.
Back (1), ¾x18½x23¼ in.
Rails (6), ¾x1x13 in.
Runners (12), ¾x1¾x22¾ in.
Center Runners (2), 5/16 in. thick, 11/16 in. wide, 22 in. long.
Framing Material, ¾x4½x approx. 31 ft.
Side Base (4), ⅞x4x11½ in.
End Base (4), 2x4x5¾ in.
Top (1), 1¼x26x48 in.
Triangle Strip (1), 2x2x18½ in.
Drawer Fronts (2), ¾x5¾x11½ in.
Drawer Fronts (2), ¾x8¼x11½ in.
Drawer Fronts (2), ¾x9¼x11½ in.
Drawer Front (1), ¾x5x18½ in.
Drawer Sides (4), ½x5x24 in.
Drawer Sides (4), ½x7½x24 in.
Drawer Sides (4), ½x8½x24 in.
Drawer Sides (2), ¾x5x22 in.
Drawer Backs (2), ½x4¼x11 in.
Drawer Backs (2), ½x6¾x11 in.
Drawer Backs (2), ½x7¾x11 in.
Drawer Back (1), ½x4¼x18 in.
Drawer Bottoms (6), ¼x11x23½ in.
Drawer Bottom (1), ¼x21x17¾ in.
Drawer Guides (6), ½x1x22¾ in.
Pencil Tray (1), 1x3x17 in.
Drawer Partitions (4), ⅛x3¼x10¾ in.
Drawer Partitions (4), ⅛x5¾x10¾ in.
One lock, 6 drawer pulls, steel glides.

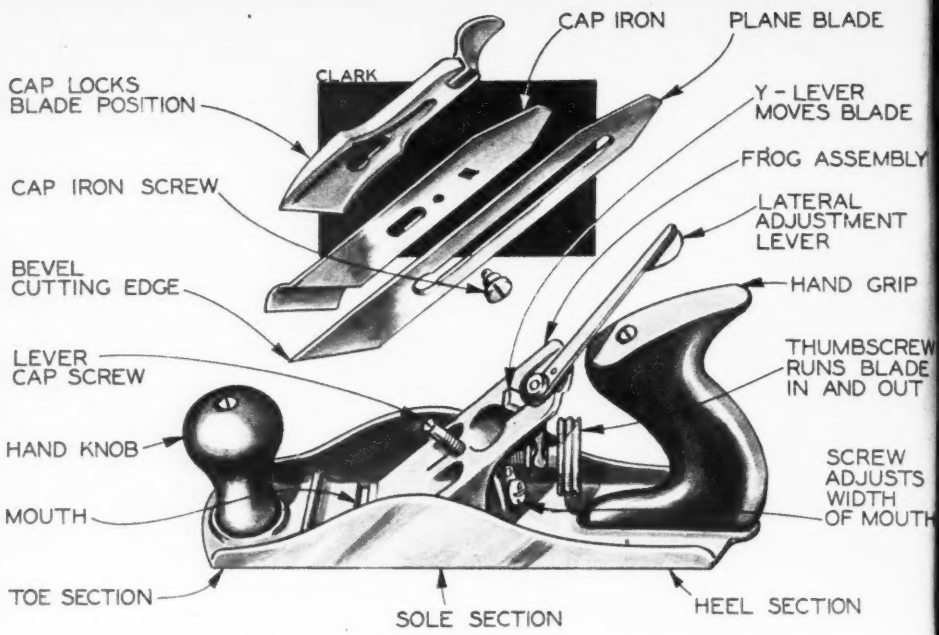
Large-Scale Plans will facilitate construction. Send fifty cents to MI Plans Service, Fawcett Building, Greenwich, Conn. Plan No. F-6.







CONSTRUCTION OF DRAWER IS SIMILAR ON ALL SEVEN UNITS

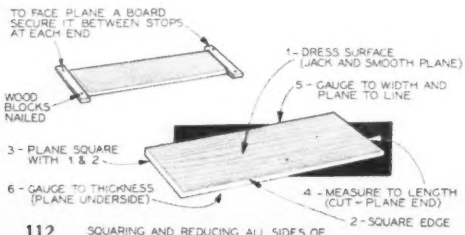


THE PLANE

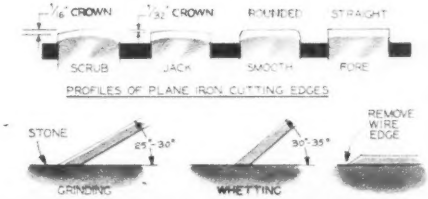
THE plane is a sharp-edged tool used exclusively for smoothing the surfaces and edges of pieces of wood. Small planes, between 3 and 7 in. long and having blades from 1 to 1⅝ in. wide, are called block planes. They require only one hand, and are used mainly for fine smoothing cuts against the grain, for finish smoothing of long curved edges (in making furniture particularly), for model making, and other light work. Larger and heavier planes, fitted with handles at both ends, are used for the general run of carpentry work.

The commonest type, called the smoothing plane, is 8 or 9 in. long and has a blade 1¾ or 2 in. wide. A somewhat longer tool, measuring 14 in. but otherwise identical with the smoothing plane, is called the jack plane. The next size class, centered around 18 in. in length is called the fore plane, and an even longer one, from 20 to almost 24 in., is known as the jointer plane. The latter two planes are slightly wider than the smoothing and jack planes, and have cutters 2⅜ or 2½ in. wide. Base length is important when very long, irregular boards must be straightened out by hand. A short plane rides up and down the curves. A long one straddles them and eventually cuts them down to flats.

The shorter planes are usually made with smooth bottoms. [*Continued on page* 168]

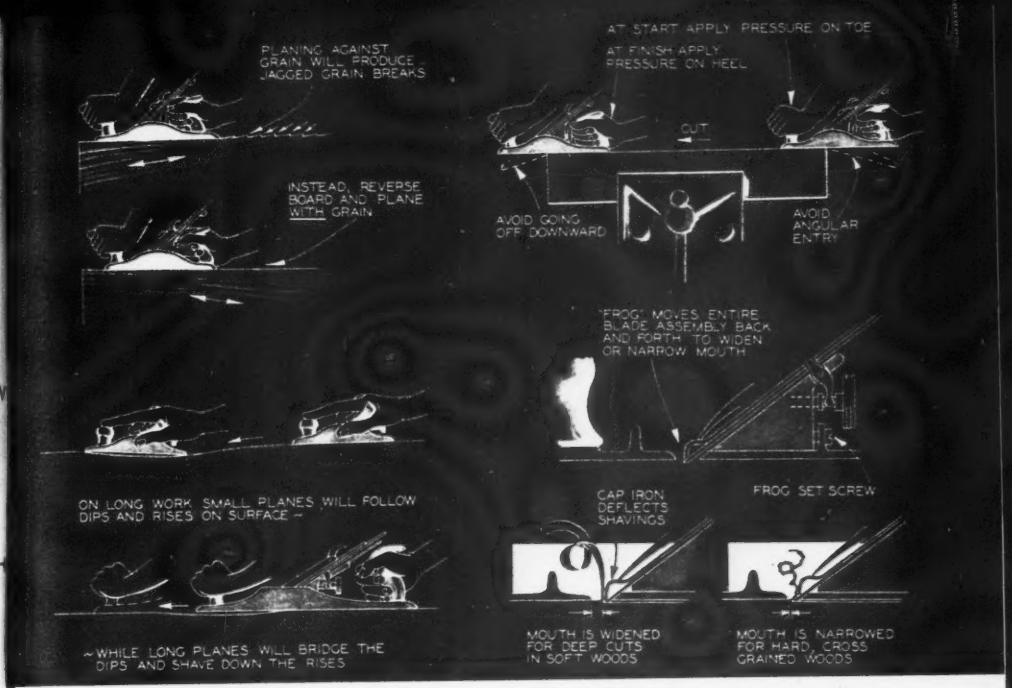


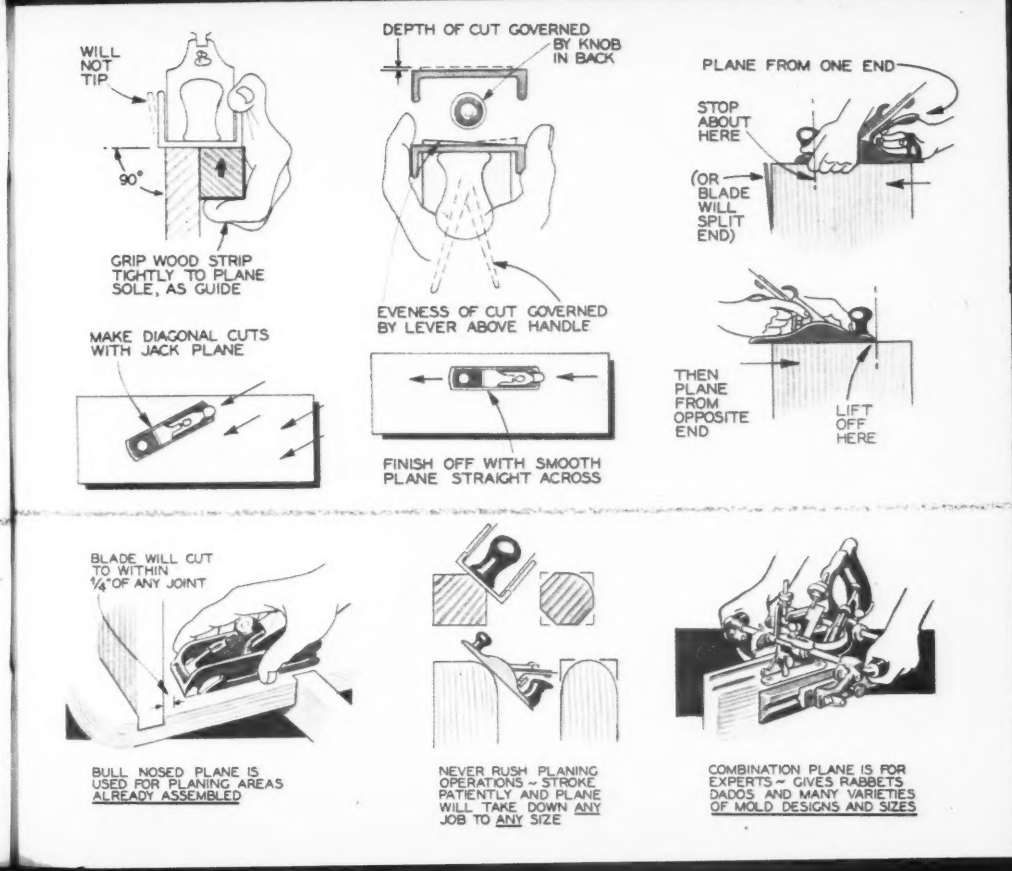
SQUARING AND REDUCING ALL SIDES OF A BOARD TO REQUIRED MEASUREMENTS

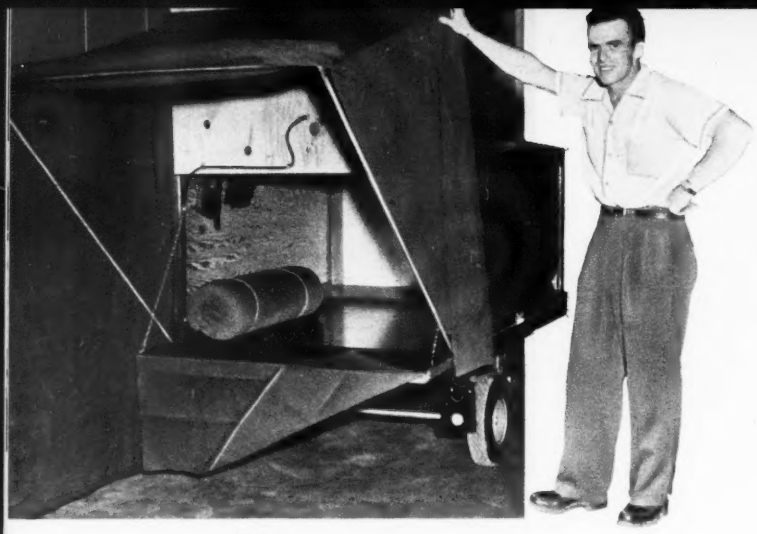


PROFILES OF PLANE IRON CUTTING EDGES

ONLY REQUIREMENT FOR TOP CUTTING EFFICIENCY IS A SHARP BLADE GROUND TO PROPER ANGLE


PLANING AGAINST GRAIN WILL PRODUCE JAGGED GRAIN BREAKS
INSTEAD, REVERSE BOARD AND PLANE WITH GRAIN
AT START APPLY PRESSURE ON TOE
AT FINISH APPLY PRESSURE ON HEEL
CUT
AVOID GOING OFF DOWNWARD
AVOID ANGULAR ENTRY
"FROG" MOVES ENTIRE BLADE ASSEMBLY BACK AND FORTH TO WIDEN OR NARROW MOUTH
ON LONG WORK SMALL PLANES WILL FOLLOW DIPS AND RISES ON SURFACE ~
~WHILE LONG PLANES WILL BRIDGE THE DIPS AND SHAVE DOWN THE RISES
CAP IRON DEFLECTS SHAVINGS
FROG SET SCREW
MOUTH IS WIDENED FOR DEEP CUTS IN SOFT WOODS
MOUTH IS NARROWED FOR HARD, CROSS GRAINED WOODS


WILL NOT TIP
90°
GRIP WOOD STRIP TIGHTLY TO PLANE SOLE, AS GUIDE
MAKE DIAGONAL CUTS WITH JACK PLANE
DEPTH OF CUT GOVERNED BY KNOB IN BACK
EVENESS OF CUT GOVERNED BY LEVER ABOVE HANDLE
FINISH OFF WITH SMOOTH PLANE STRAIGHT ACROSS
PLANE FROM ONE END
STOP ABOUT HERE
(OR BLADE WILL SPLIT END)
THEN PLANE FROM OPPOSITE END
LIFT OFF HERE
BLADE WILL CUT TO WITHIN ¼" OF ANY JOINT
BULL NOSED PLANE IS USED FOR PLANING AREAS ALREADY ASSEMBLED
NEVER RUSH PLANING OPERATIONS ~ STROKE PATIENTLY AND PLANE WILL TAKE DOWN ANY JOB TO ANY SIZE
COMBINATION PLANE IS FOR EXPERTS ~ GIVES RABBETS DADOS AND MANY VARIETIES OF MOLD DESIGNS AND SIZES



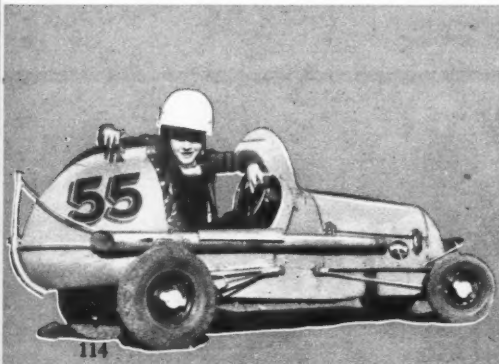
Camping trailer is the weekend home of M. W. McBride, State College, Pa., during hunting season. The plywood-paneled body was set in a walnut frame. Body size is 4x5 ft. with a 1-ft. extension for sleeping.

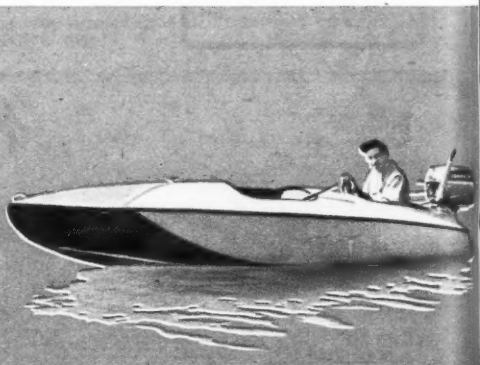
mi WORKBENCH AWARD WINNERS

Each craftsman whose project is shown here receives a $5 check and a Workbench Award Certificate. How about sending us a photo and description of your latest project? If you aren't a winner, you may still receive a Certificate Of Merit. Photographs of your workshop are also eligible for an award. Send entries to MECHANIX ILLUSTRATED Workbench Awards, 67 West 44th Street, New York 18, New York.

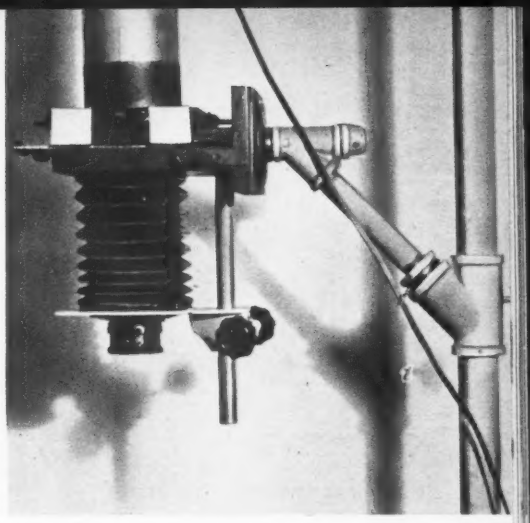
The Midget-Midget is what builders Tom Hill and O. O. Norton, Knoxville, Tenn., call this project. Powered by a 2-hp Briggs and Stratton engine, car can achieve 25 mph. Length is 5 ft. 8 in., width 29 in.

Snappy outboard took Charles P. Hufford, Clarksburg, W. Va., six months to build. Power is supplied by a 16-hp Johnson motor equipped with a racing wheel. The 12 ft. 4 in. craft hits a speed of 30 mph.





Solid mahogany tier table built by William Seitel of Brooklyn has a 3/8-in. electrical conduit running through the center of the main support. Bill turned the metal finial and made the lamp shade, too.

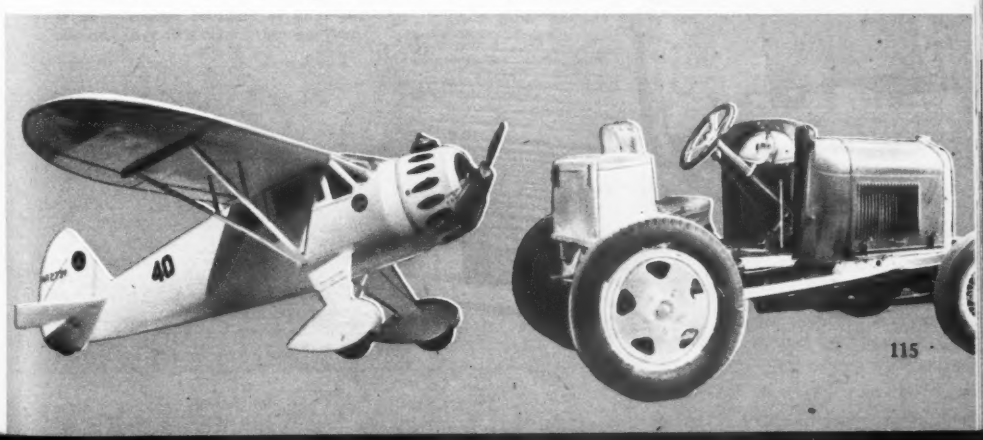


Condenser enlarger for 2¼x2¼-in. negatives was designed and constructed by A. Kirshenbaum, Montreal. Standard pipes and fittings were employed as supports. Bellows and lens came from an old camera.

Electrical engineer Cener Zeljko of Ljubljana, Yugoslavia, has his shack in the town's tallest building. He constructed his own radio set and, in case some of you hams are interested, his call letters are YU3FLL.

Mr. Mulligan, MI Plan No. 374, is the project of 14-year-old Armond Ruocco, a student at Brooklyn Technical High School. Powered by an Ohlsson and Rice engine, the model has proved highly successful.

A stripped-down Model A was converted into a powerful utility tractor by H. G. Bauer of the Bronx. The chassis was shortened 22 in., and a four-speed truck transmission replaced the original set-up.

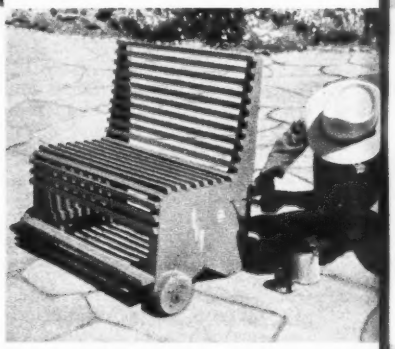


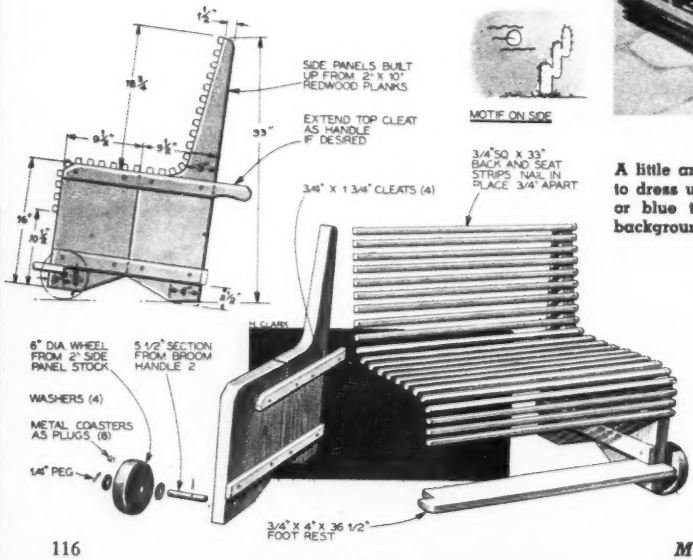
MAKE one of these roller benches if you would like to add utility and charm to home grounds at little cost. You can cut the slats, end panels and wheels out of salvaged lumber and produce a useful porch or patio "visitor greeter" for less than a dollar and a half.

The slats are made of ¾-in. fir veneer. The ends are 1¾-in. redwood planking, cut as indicated. The foot bar consists of three slats nailed over each other. The wheels were sawed out of trimmings from the end panels, a 1-in. hole bored in their centers and mounted on pieces of ⅞-in. broomsticks, as shown.

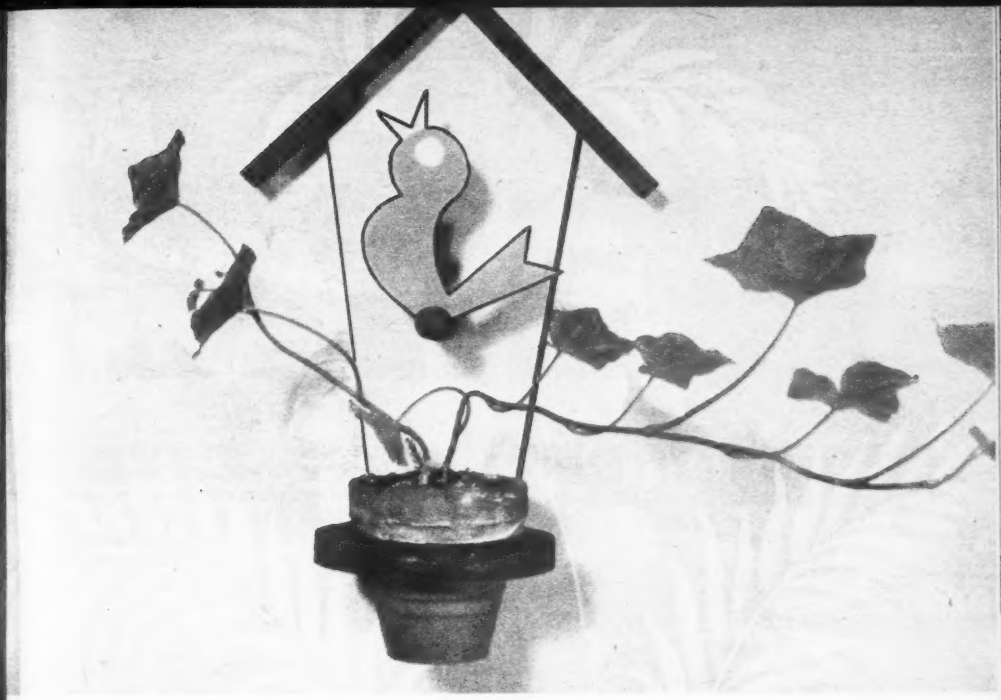
When finished and sanded, the bench was painted a creamy tan and the wheels orange.—*Lyndon Ripley* •

Weekend Projects





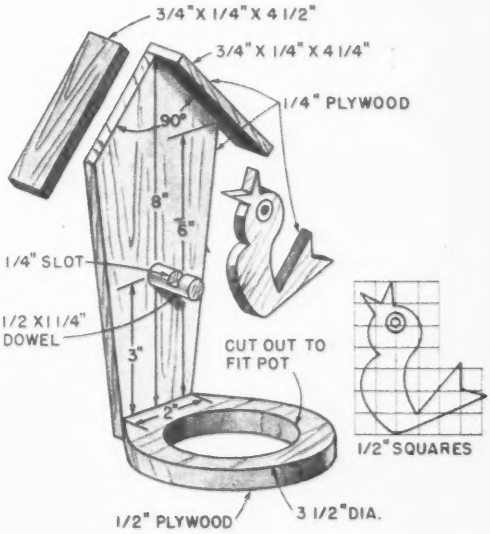
A little art work will go a long way to dress up your project. Use orange or blue to contrast against yellow background. Finish with spar varnish.

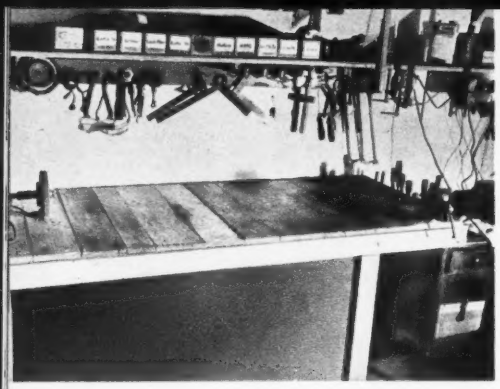


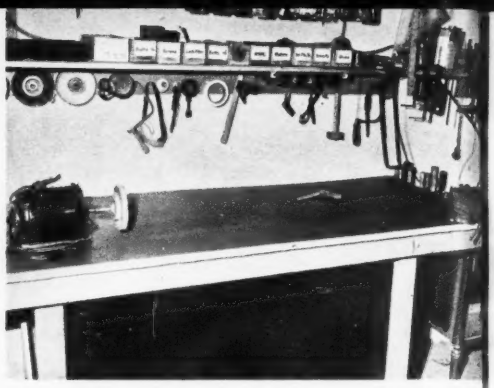
KNOCK out this cheerful ivy bracket with a minimum of effort and materials. The roof, back panel, and the bird itself are cut from ¼-in. plywood. Jig out the flower pot holder from ½-in. plywood.

Assemble with brads, then sand. Finish with quick-drying enamel. The unit pictured has a yellow back panel and a red roof and holder; the bird is blue. Attach with picture hanger.—*Carl Sorensen.* •

Colorful bracket will enhance any wall in your home. Small jig saw, below left, is ideal for cutting the flower pot holder.

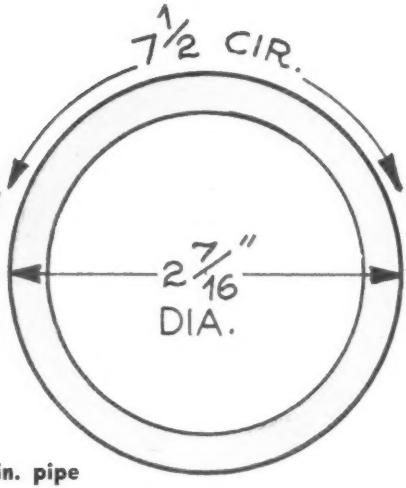






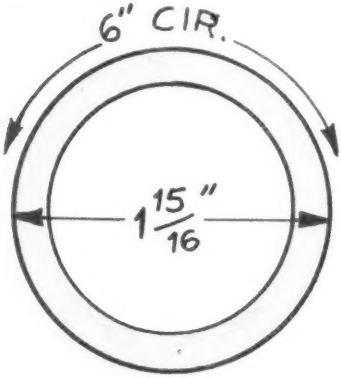
SHOP SHORTS

Scarred, uneven workbench tops are hard to work on. You can administer a quick face-lifting job by applying a panel of tempered Masonite. Note the difference in above photos. Space countersunk screws one foot apart to serve as a built-in ruler.

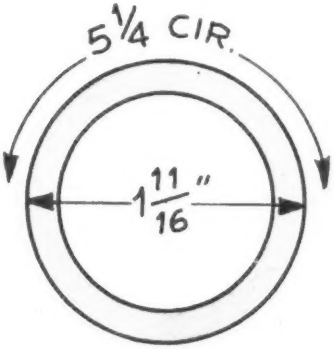


2-in. pipe

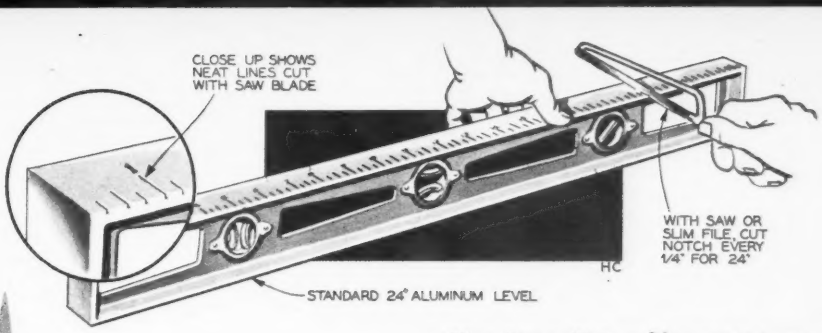
To determine the diameter of an unknown pipe size, follow directions shown in the sketches at right, then check against the actual sizes reproduced below and to the left. You might find it helpful to cut out these drawings and mount them on stiff cardboard for use as guides when needed.



1½-in. pipe

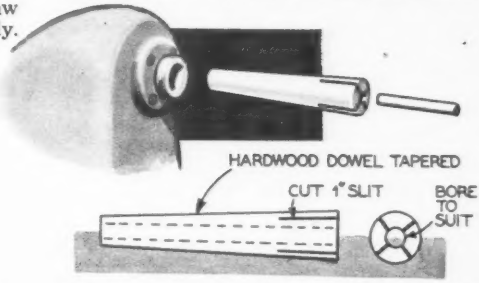


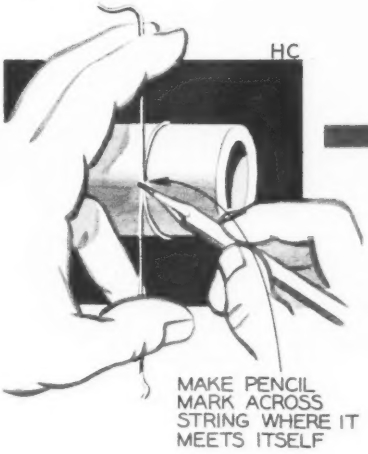
1¼-in. pipe

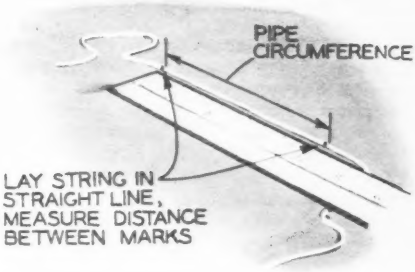


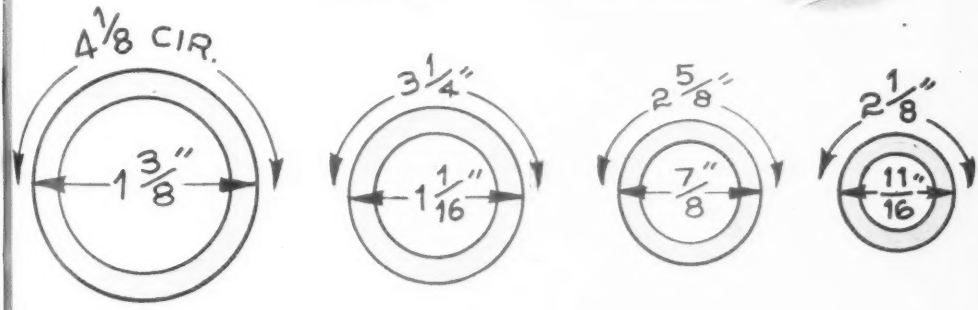
Your level scribed with marks at ¼-in. intervals will save time and temper on countless jobs. Use a fine-toothed hack saw or a file to make nicks on one side only.

Wooden collet enables you to turn small piece of wood to ¼ in. in diameter. Use a length of hardwood slightly larger than the center in the headstock of your lathe. Turn it to the same taper as the center, bore longitudinal hole, then cut slits as shown.

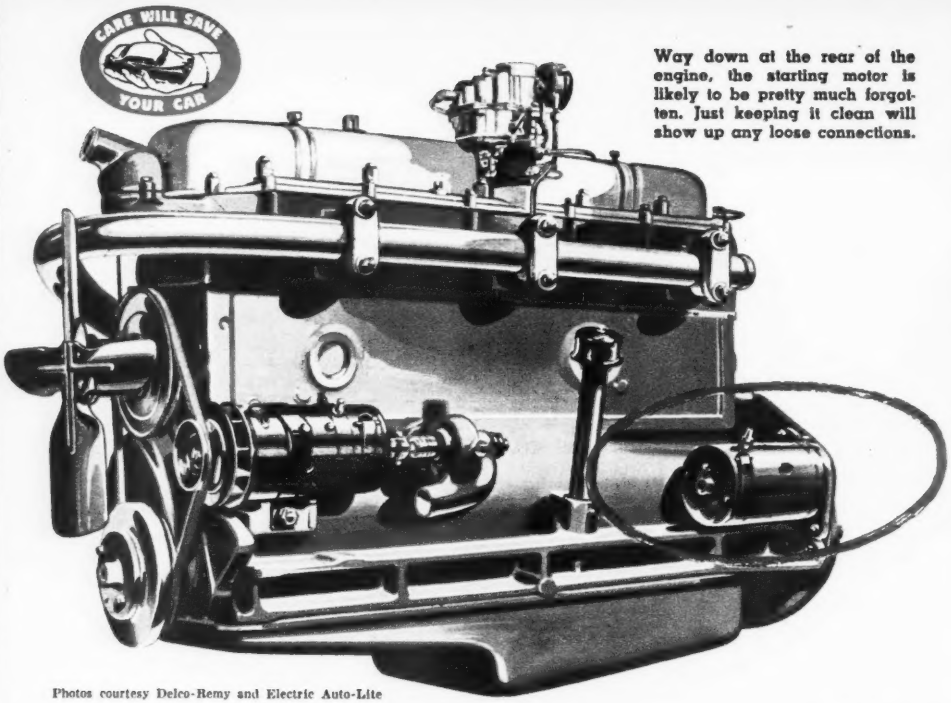








1-in. pipe **¾-in. pipe** **½-in. pipe** **⅜-in. pipe**



Way down at the rear of the engine, the starting motor is likely to be pretty much forgotten. Just keeping it clean will show up any loose connections.

Photos courtesy Delco-Remy and Electric Auto-Lite

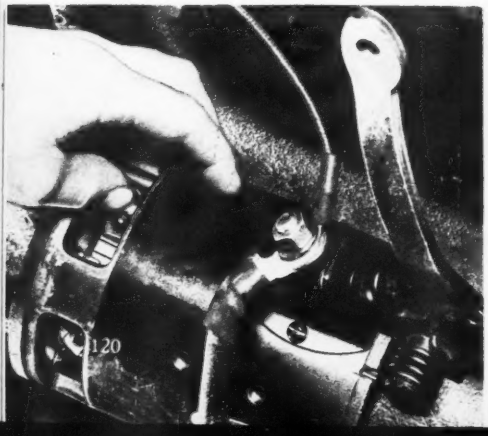
car care

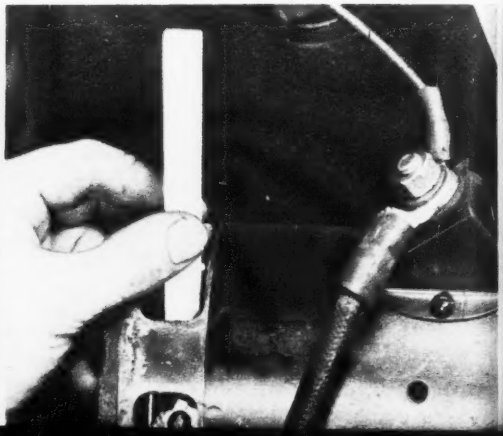
The Starter

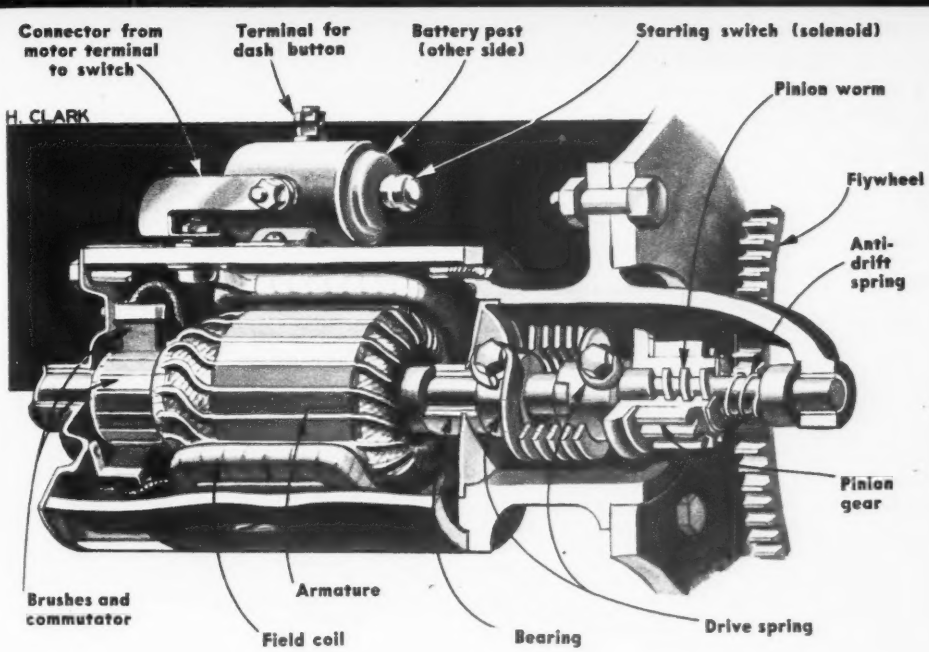
FORTY-ONE years have rolled into history since Charles F. Kettering put the first electrical cranking device on an American automobile, but to millions of motorists it still is not only a mystery but the forgotten part. That is, forgotten until it kicks over the traces. At this point bystanders revise the old cry, "Get a horse!" by asking, "Want a push?". The hand crank having been buried since way back a brief tow or a push is your only hope of getting the motor started.

If the battery is up to par and the connections to the starter are okay, the next point to check is the brushes. Make sure they are seating properly.

To remove a small amount of dirt or light grease from the commutator, hold a strip of No. 00 sandpaper against it. Crank engine with ignition off.





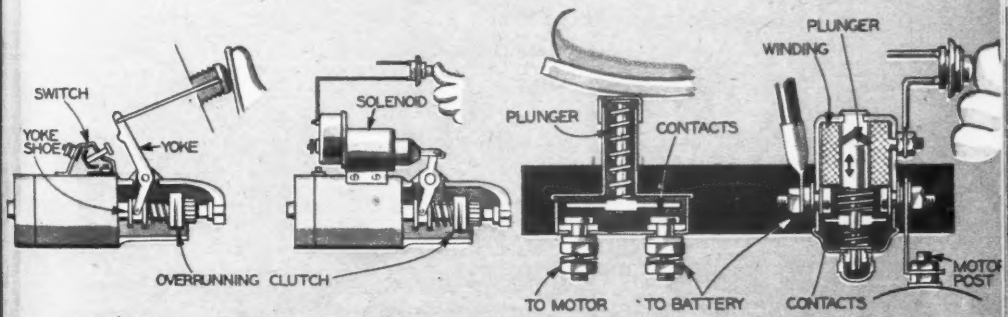


SECTION THROUGH AVERAGE ELECTRIC STARTING MOTOR (INSTALLED)

By Frederick C. Russell

The starting motor is a glutton for work but it will stand just so much neglect and abuse and no more. Confused by references to the overrunning clutch, the solenoid or the Bendix drive, many owners throw up their arms and decided to wait out the inevitable day when the system breaks down. Actually if we mentally break it down into its essentials the starting system is no mystery at all.

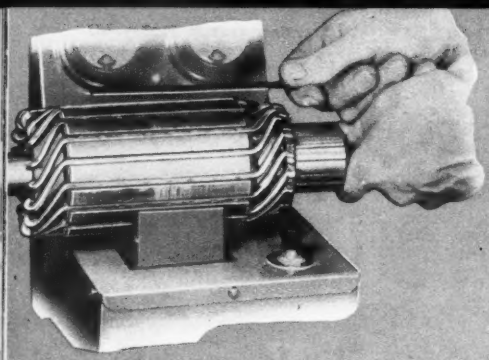
Since it requires a cranking speed of some 200 rpm to start an engine the comparatively small electric motor used for the job is geared down to about 15 to 1. Thus its armature may run between 2,000 and 3,000 rpm to do the job. Even so, the starting motor may draw as much as 600 amperes from the battery on a cold morning. We ease its load by using light oils and by providing higher output generators to



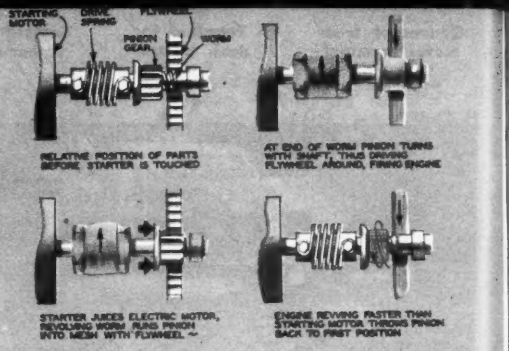
OTHER STARTER MOTORS HAVE YOKES THAT ENGAGE PINION TO FLYWHEEL FIRST, CLOSE SWITCH SECONDLY, MANUALLY OR ELECTRICALLY

SECTION THROUGH MANUAL SWITCH

SECTION THROUGH SOLENOID SWITCH



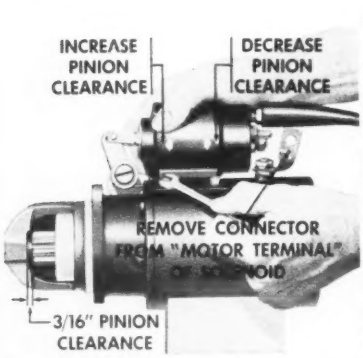
A short can be located by placing the armature in a "growler" and rotating it slowly with a steel bar held over it. Steel will vibrate if short exists.

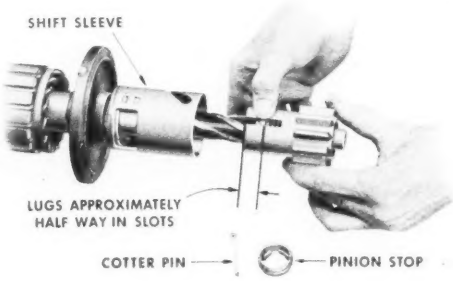


How starter cranks the engine. Damage may occur if you attempt to restart the engine after a stall while the engine is still "rocking."

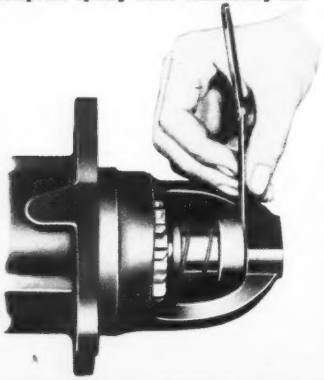
help keep the battery near full charge.

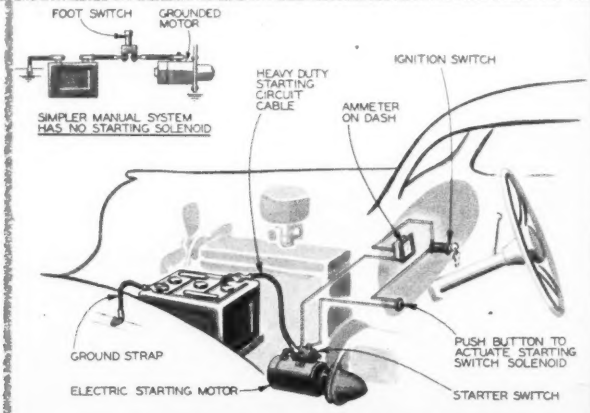
Every engine has a gear on its flywheel circumference into which a pinion gear at the end of the starting motor shaft meshes. This meshing may be mechanical, your foot pressing a lever, or the clutch pedal or the accelerator pedal, to push the pinion with an overrunning clutch into mesh with the ring gear. Or the manual action can be replaced with a solenoid which actuates the shift lever on the starter drive. A very popular system uses the Bendix drive which serves as an automatic connecting link between the cranking motor and the flywheel ring gear. The instant you touch the starter button [*Continued on page* 160]





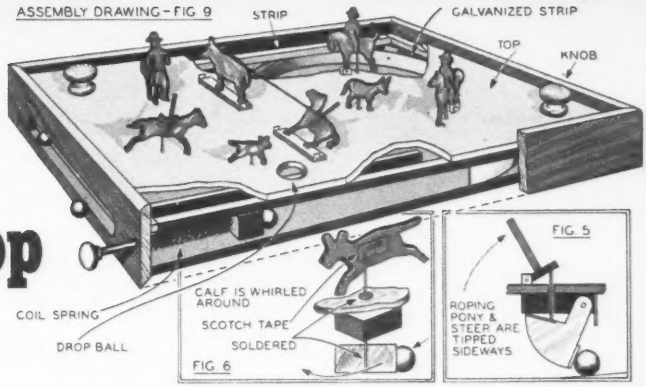
Correct stop clearance for the Bendix drive is important. Take care not to compress spring while conducting test.





WIRING DIAGRAM OF AN AVERAGE ELECTRIC STARTING SYSTEM

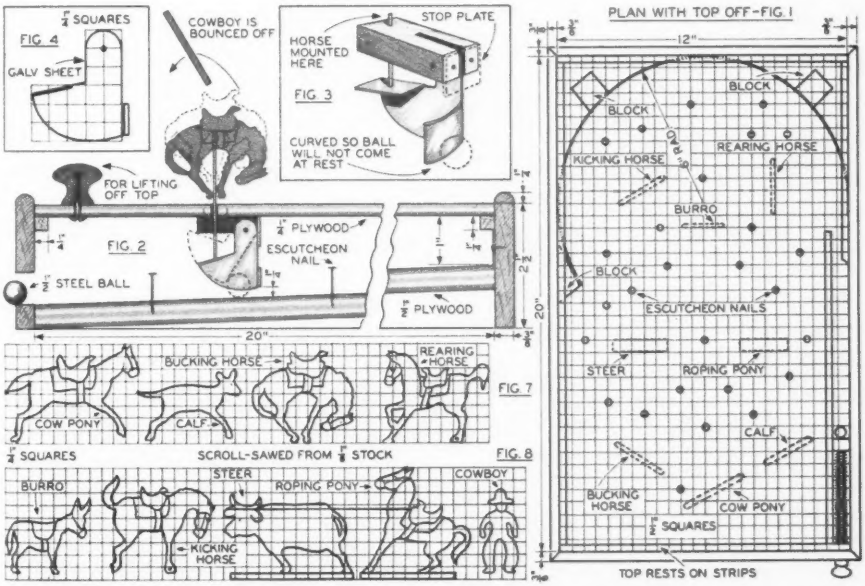
Table-Top Rodeo



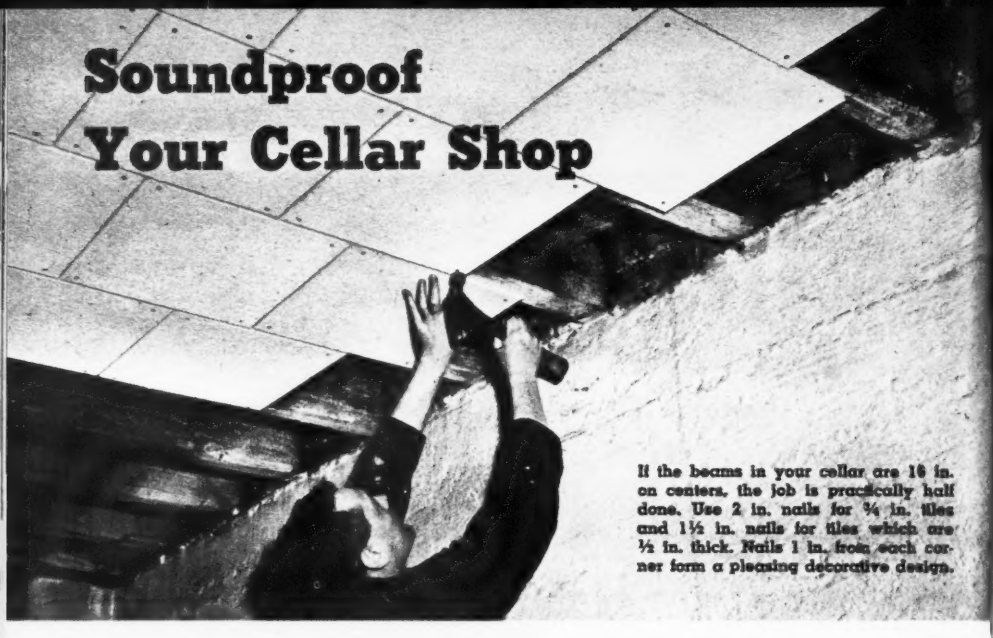
HERE'S one lively western game in which horses get a break, for the object is to unseat the riders to win points. Demerits are scored when the steer is thrown. It is designed on the principle of the familiar bagatelle game, with steel balls rolled up an incline by means of a plunger.

Plan of the box with locations of pins and horses is given in fig. 1, and a sectional view with dimensions in fig. 2. The latter shows the action of the mechanism in connection with the stiff-legged bucking horse. A galvanized-sheet swinging bracket is cut and bent as in fig. 3 and suspended in a slot in a block secured to the underside of the top. When the ball strikes the curved plate the pin upon which the horse is mounted is flipped upward and the cowboy, whose seat is none too stable, is thrown off. Fig. 4 gives the profile of the bracket for the lower end of the board, and it should be shorter on the upper end in order to clear the inclined bottom by at least ⅛ in.

The steer and roping pony are mounted on bases hinged to flip over sideways, as in fig. 5, and the calf [*Continued on page* 171]



Soundproof Your Cellar Shop



If the beams in your cellar are 16 in. on centers, the job is practically half done. Use 2 in. nails for ¾ in. tiles and 1½ in. nails for tiles which are ½ in. thick. Nails 1 in. from each corner form a pleasing decorative design.

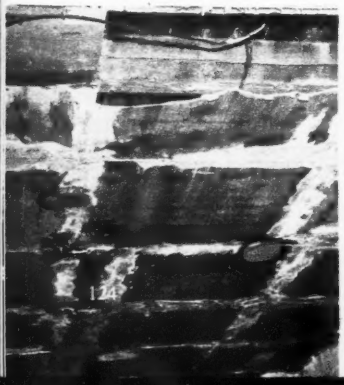
New sound-absorbing tiles will make your shop a brighter, quieter place in which to pursue your hobbies.

By Robert Brightman

WANT to work in your shop late? And the family says, "Cut it out, we want to sleep." Well, they can have their shut-eye and you can have the pleasure in your shop too. How? Easy enough. Soundproof the ceiling of your cellar.

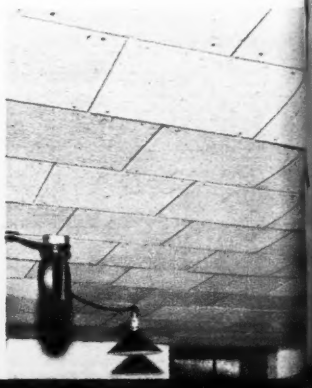
If you can saw a straight line and drive a nail straight, the job's a cinch. It's especially easy if the ceiling beams or joists in your cellar are on 12 or 16 in. on centers. The latter dimension is usually the case. If so, and provided the ceiling is fairly level, the job is a snap. Merely nail acoustical-type tile to the beams. If the beams are not a standard 12 or 16 in. on centers,

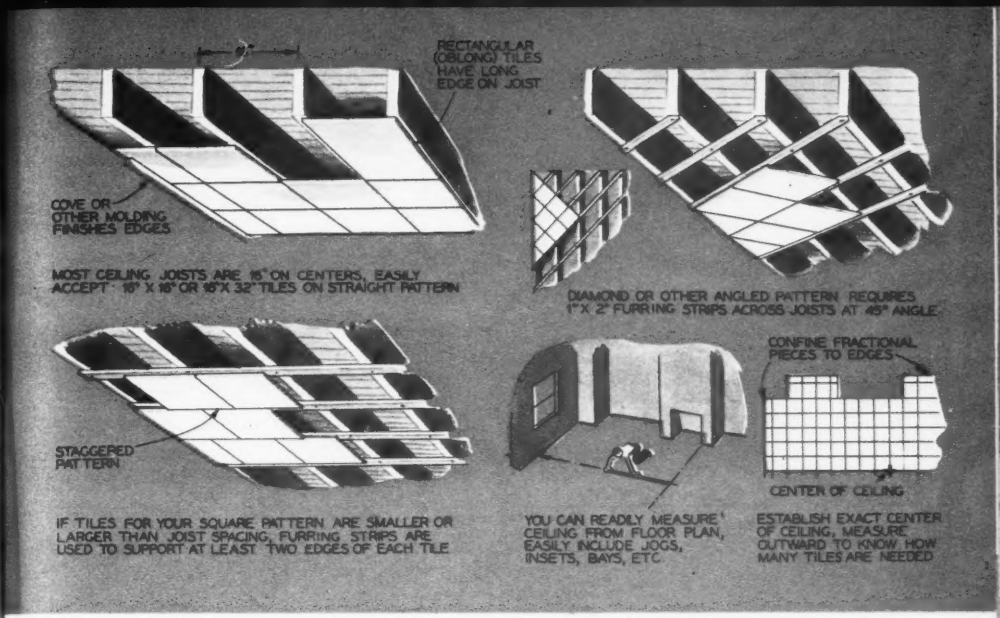
Original cellar ceiling was covered with plaster boards badly chipped because of repair work.



First step was to rip down all boards and withdraw nails. A dusty job, wear a respirator.

The finished job. Reelite drop light can be moved to conveniently located screw eyes in cellar ceiling.



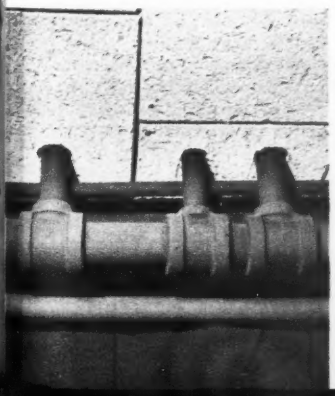


the job becomes a bit more involved, but still not too bad. In this case you will have to nail a series of furring strips at right angles to the beams as a support for the tiles.

While nailing directly to the beams limits the pattern somewhat, this is not the case if you use furring strips. Practically any design can be used provided it is in a multiple of the size tile you are going to use. A convenient size to purchase is the 16 in. size. If you choose to nail directly against the ceiling beams, as was done in this job, your work will look somewhat more finished if you nail the tiles in a brick work pattern instead of regular squares. With a brick pattern slight deviations along the staggered axis will not be noticeable.

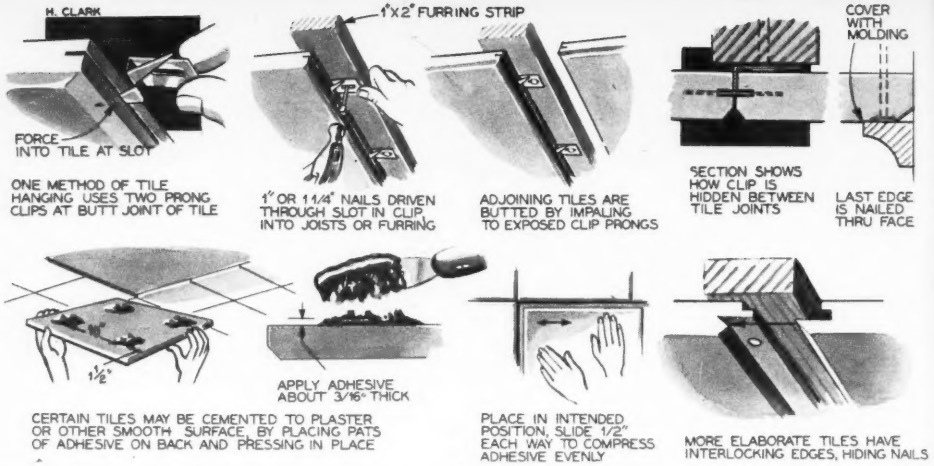
As shown in the drawing, special clips are available for securing the tiles to the ceiling or you can use cement. However, you do an equally satisfactory job by using box nails. One nail at each corner about an inch in from each edge secures the tile and also adds a decorative touch. You'll find the over-all effect of the nail pattern quite pleasing. Use 2 in. nails for ¾ in. tiles and 1¼ in. nails for the half-inch thick tiles. The tiles used, Fiberlite, made by the Insulite Div. of Minnesota and On-

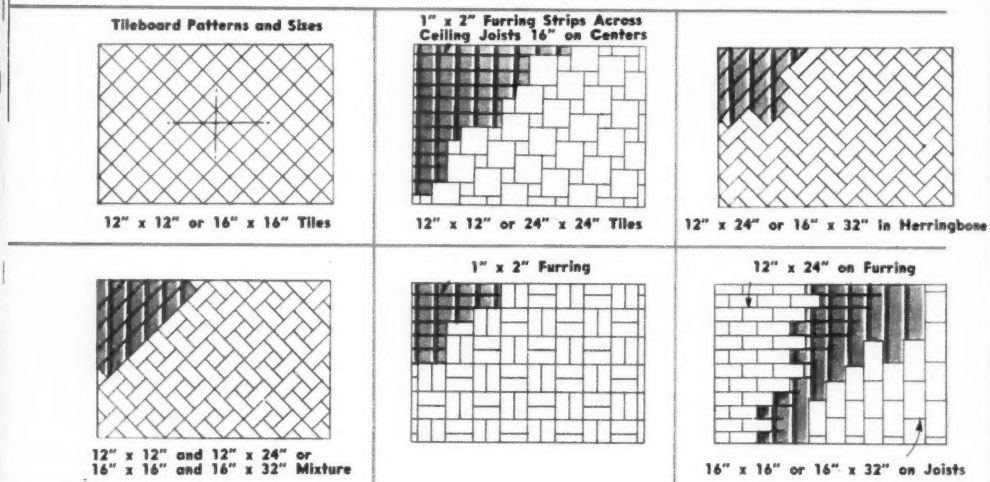
To locate tiles around pipes, use a hole saw for opening and cut parallel slits for passage of pipe.



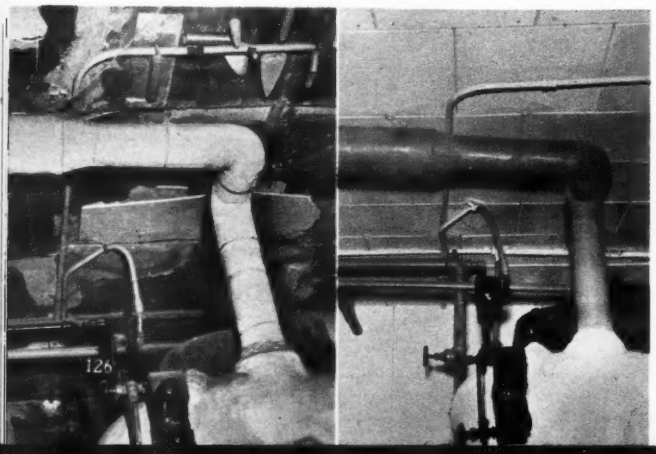
Tiles can also be used for wall partitions. Area near furnace is covered with fire-retardant paint.

Space-saving shelves are built-in between wall joists. Clip holds Pyrene fire extinguisher.



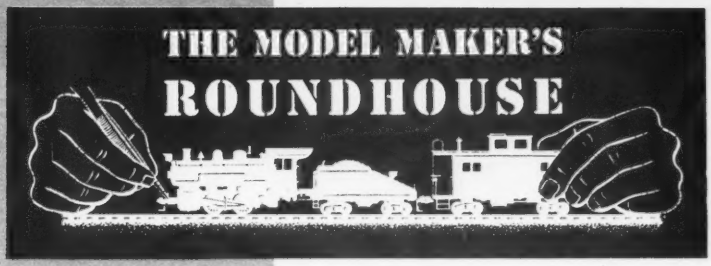


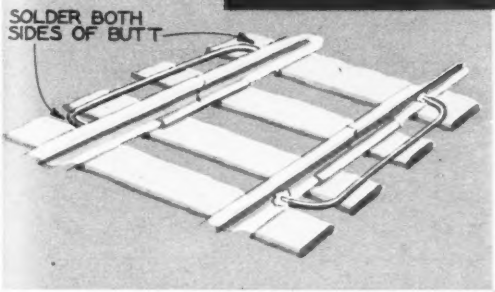
A "before" and "after" view of the same area. All exposed piping was painted a light gray with furnace white and doors and stack black. Area above the furnace is protected with fire-retardant tile.



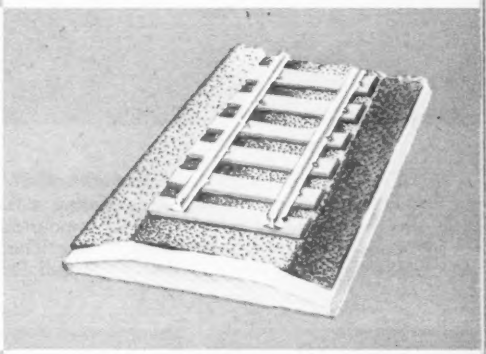
tario Paper Co. are available in buff or white in ½ in. or ¾ in. thicknesses. The ¾ and ½ in. thick tiles are packed 36 tiles to the case and will cover 64 sq. feet. Acoustical tiles of the type described, vary in price from 10 cents to 12 cents per tile depending upon the thickness and finish. Other companies making acoustical-type tiles are Celotex Co., Johns-Manville Co., National Gypsum Co., and U. S. Gypsum. •

THE MODEL MAKER'S ROUNDHOUSE

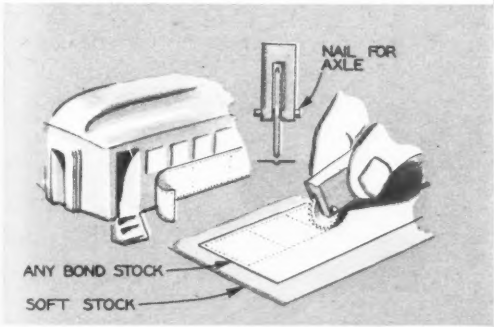




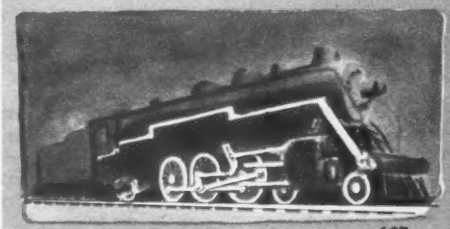
Fish plates are fine, but for positive electrical contact, solder jumper wire to each end of the rail as shown in drawing at left.



A light coating of black paint on sandpaper makes a realistic roadbed ballast. Apply sparingly and wipe off surplus paint with a rag.



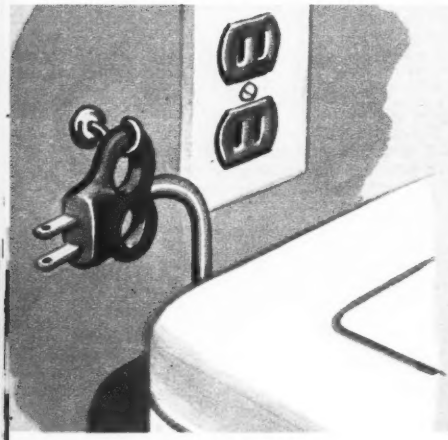
A watch gear, mounted in a handle makes a fine tool for impressing rivet marks in paper. Paper is then cemented to car sides.

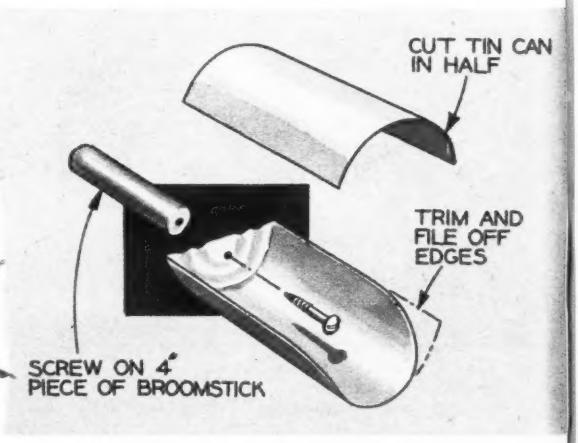


Luminous paint, applied to the drivers, wheels and catwalks makes night rolling stock really impressive. Before turning off room lights, charge the paint by exposing to a bright light for few seconds.

home and hobby hints

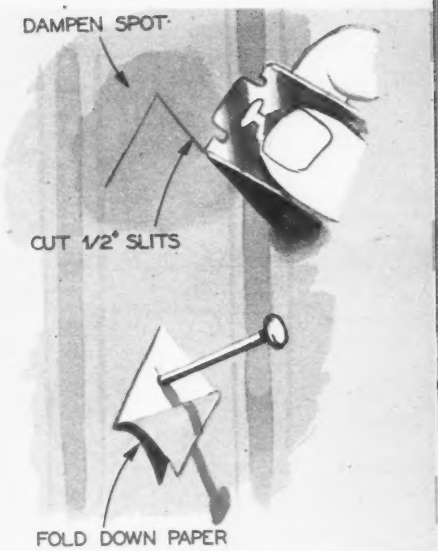
Plastic chessmen can be made to resemble ivory pieces by weighting with bird shot, then sealing with Plastidur, a casting compound. After adding the shot, the compound is mixed with its hardening catalyst, poured, and allowed to dry. The material, which comes in clear, ivory, and black, may also be used for making toys, jewelry, novelties, etc.





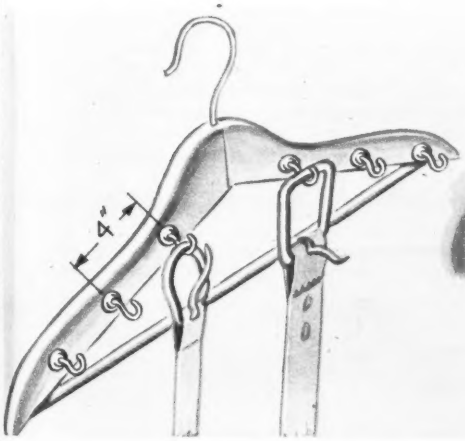
Electrical appliances that are not used daily, like washing machines, broilers, and so on, often have cords that interfere with standard devices. Attach a plug of the type shown; hang near outlet for accessibility.

Set of scoops can be fashioned from tin cans of various sizes. Split cans through centers from end to end. Snip off sharp corners, file edges, and screw on a short piece of broomstick or length of dowel.



Your plastic stamp dispenser will always be on hand if attached to the inside of your desk's stationery drawer. Drill two holes in the bottom of the dispenser. Fasten with a pair of roundhead wood screws.

Wallpaper saver. When hanging pictures on papered walls, cut two slits as indicated and fold down paper. Drive nail in the exposed plaster area. If you ever want to remove picture, pull out nail, repaste.



Jiffy belt hanger is made by inserting 6 cup hooks into an ordinary wooden coat hanger. Leave 4-in. intervals to accommodate extra-wide belts. When completed, unit will hold up to a dozen assorted sizes.

Leather tooling and embossing is greatly facilitated if you moisten your leather before attempting to work on it. Let stand for a few minutes to achieve uniform absorption. Glass makes a good work surface.

bicycle repairs

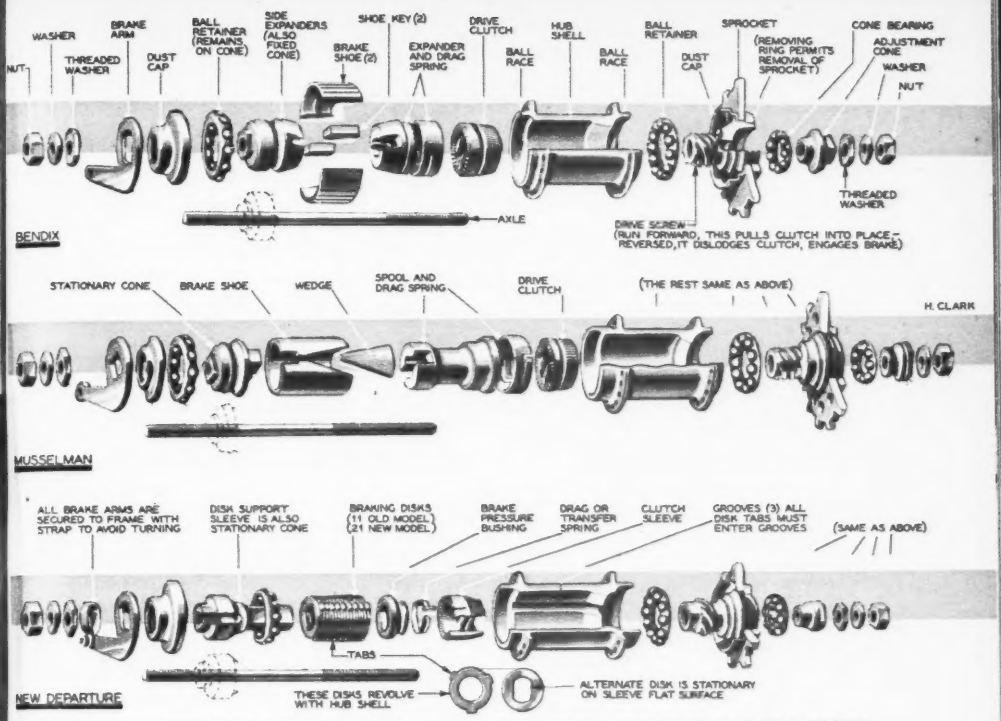
Back off the chain adjuster if the chain is too tight for easy removal.

HAVE you ever tried to catch that squeal in little Johnnie's bicycle brake? Or, tried to adjust the brake on Janie's bike? If you've given up in despair these pictures and drawings should make bicycle brake repairing your meat instead of your nemesis. The three brakes discussed are the Bendix, the Musselman, and the New Departure. You can find the name of your brake stamped on the brake arm or on the hub between the spokes.

To remove the rear wheel from your bike, first turn it upside down. Place a small box under the seat to keep the rear fender off the floor. Unscrew the rear axle nuts and slide the braces and washers off the rear axle. Remove the nut and bolt from the brake arm clip and loosen the chain adjusting screws as far as possible. Turn the pedals forward until the chain falls off the front sprocket. You can then remove it from the rear sprocket. Then slide the wheel from the frame.

The ball bearing retainers on the Musselman and Bendix brakes should not be removed from their races. However, if the balls or races are pitted or broken, here is how to remove the defective bearing and replace it with a new one. First try to push the retainer back and off the race without removing any balls. If the retainer won't come off, pry out just enough of the balls

Removing the axle. Note that the left hand is ready to receive all the parts as the axle is withdrawn.



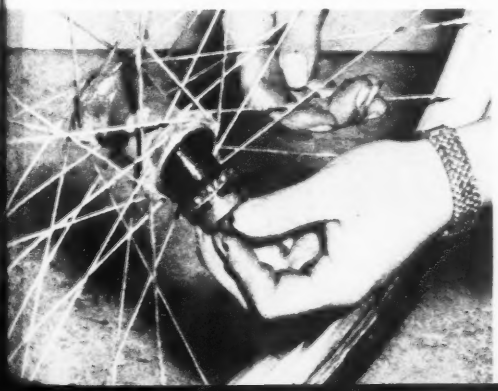
COMPLETE BREAKDOWN OF PARTS IN BENDIX, MUSSELMAN, AND NEW DEPARTURE BICYCLE BRAKE AND DRIVE MECHANISM

to permit you to slide the retainer off. To replace with a new retainer, first be absolutely sure you have it in the right position, so that the balls face the center of the hub. Then press the retainer over the race until it seats, prying a few balls out first, if necessary.

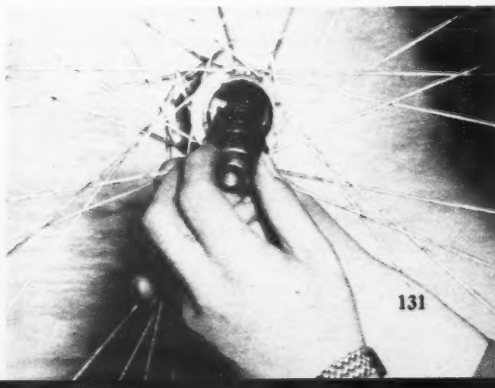
Regulation of cone tightness can be done from the arm side of the brake after the entire brake is assembled. Hold the wheel on edge and turn the arm forward or backward, moving the stationary cone in or out, until proper adjustment of cone tightness is obtained. When correctly adjusted, the sprocket should turn freely, with no binding, and there should be no more than $\frac{1}{16}$ in. side play. Now tighten the lock nut to the arm.

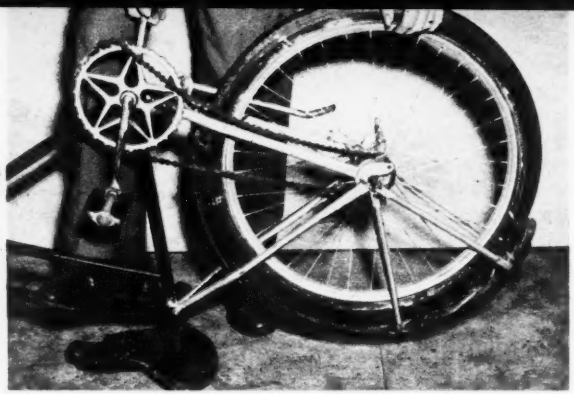
The sprocket drive screw assembly should not be taken apart unless the sprocket is so worn out that it needs replacement. This can be determined if the

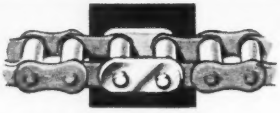
Removing parts from brake hub. Bendix and Musselman retainers should not be removed from races.



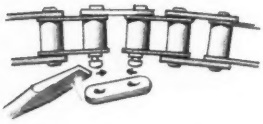
Before replacing, grease all parts with cup grease except disks on New Departure brakes.



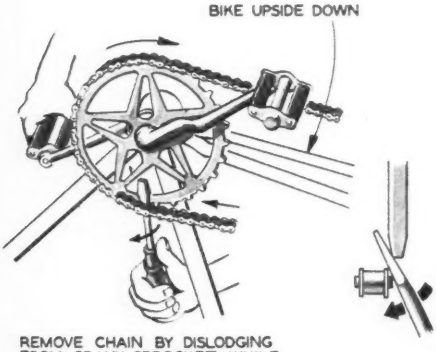




TO TAKE A CHAIN APART
LOOK FOR 'MASTER' LINK ~



BEND CHAIN SIDEWAYS
AND HALF OF LINK
CAN BE PRIED OFF



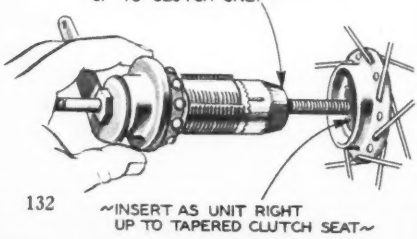
REMOVE CHAIN BY DISLODGING
FROM CRANK SPROCKET, WHILE
SLOWLY TURNING CRANK FORWORD

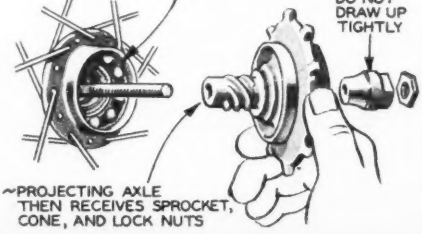
Photo at left shows method of adjusting the cone. Turn the arm forward or backward, moving the stationary cone in or out until sprocket turns freely with no more than 1/16 in. of play. Picture above indicates method of replacing the chain. Start the chain on the bottom of the sprocket wheel and then turn the pedals forward.

rear wheel grinds or clicks when the pedals are turned. Look at the teeth of the rear sprocket, which should be shaped like a straight-sided triangle, with the top slightly rounded. If one side of a tooth is worn until the tooth looks somewhat hook-shaped, the sprocket should be changed. Since this requires special tools and equipment, take the sprocket assembly to a repair shop.

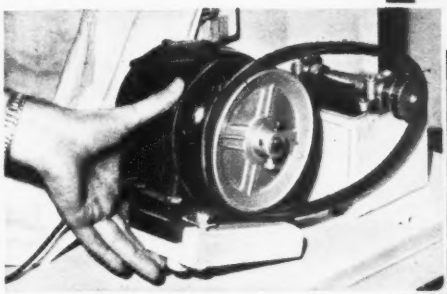
All inner parts of the brake should be greased with cup grease. Be sure the bearings are well greased, to reduce wear and pitting. The only places that need not be greased are the outer surfaces of the brake shoes, the tapered, ridged surfaces of the clutch, and the disks of the New Departure brake. Be sure to put at least a thin film of grease on all the other parts that go inside the brake.

A few hints on the causes of a few troubles: If your pedals slip forward or backward, look for transfer or retarder spring weakness, or for wear on the clutch. If the brake locks, the cones are too tight. If the brake squeaks, [*Continued on page* 157]





SHOP-VAC



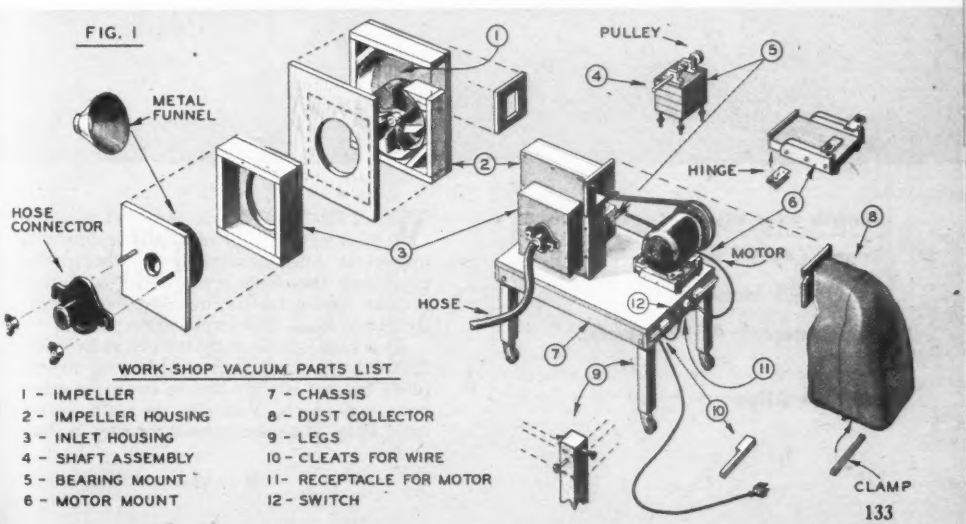
The mount into which the motor fits is hinged so that the weight of the motor maintains the proper tension on the belt.

TO do neat work, it follows that your shop must be clean and not messed up with sawdust. This is most important if you plan to do any wood finishing; the sawdust will ruin all your work. This unit is easy to build and the motor, which is the only major item, can be borrowed from one of your power tools.

The construction of the impeller requires little explanation. The disk which forms the spider of the wheel is cut from sheet metal with a jig saw or coping saw. The fins are cut from the same metal to the dimensions indicated, then bent to provide a horizontal leg which is drilled and riveted to the disk. The ½-in. collar should have an outside diameter of approximately 1½ in. and be riveted securely to the impeller with three rivets as indicated. Before attaching the collar to the impeller be sure to drill a ⅛-in. hole through it and the shaft on which it will be mounted. Also by drilling this hole through the collar and shaft simultaneously an exact alignment is assured for the retaining pin.

The construction of the wooden casing is self-evident from the drawing, the spiraled channel is made of No. 20 gauge sheet metal 2⅛ in. wide. This will be approximately 26 in. long before being shaped to the curve and screwed to suitable braces within the casing. A 5-in. diameter hole is cut in the front panel of the impeller housing directly in front of the [*Continued on page* 188]

FIG. 1

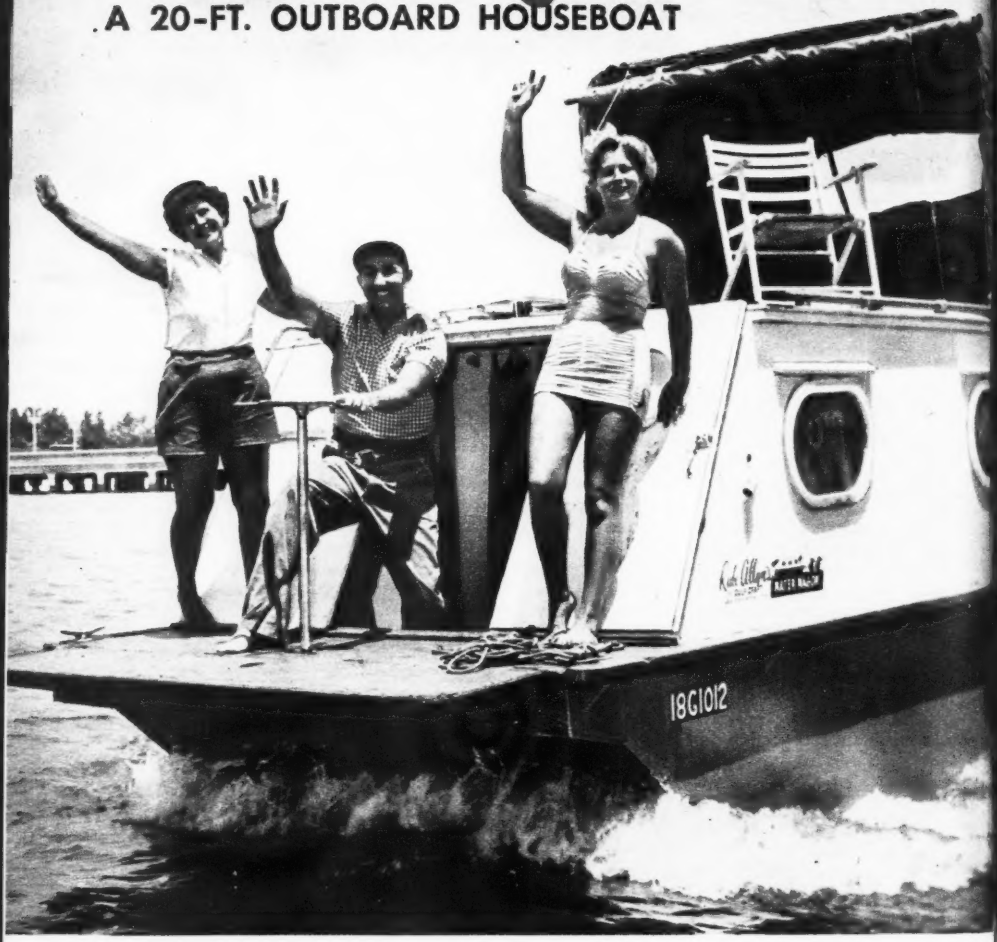


WORK-SHOP VACUUM PARTS LIST

1 - IMPELLER	7 - CHASSIS
2 - IMPELLER HOUSING	8 - DUST COLLECTOR
3 - INLET HOUSING	9 - LEGS
4 - SHAFT ASSEMBLY	10 - CLEATS FOR WIRE
5 - BEARING MOUNT	11 - RECEPTACLE FOR MOTOR
6 - MOTOR MOUNT	12 - SWITCH

Water Wagon

A 20-FT. OUTBOARD HOUSEBOAT



Length over all: 22 feet 9 inches.

Beam: 7 feet 7 inches.

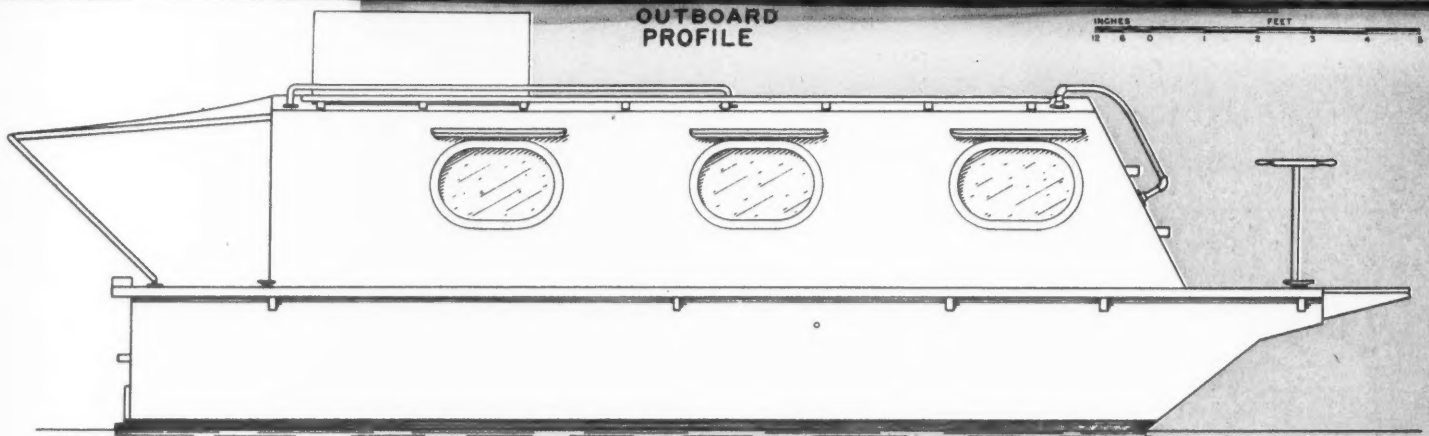
Draft: 5½ inches.

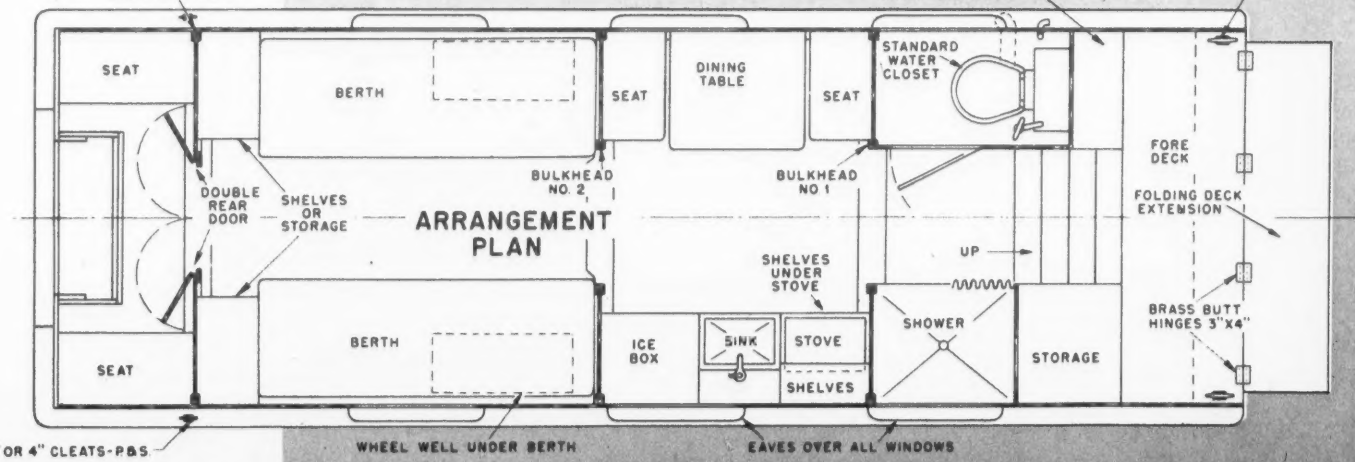
Displacement: 4,600 pounds.

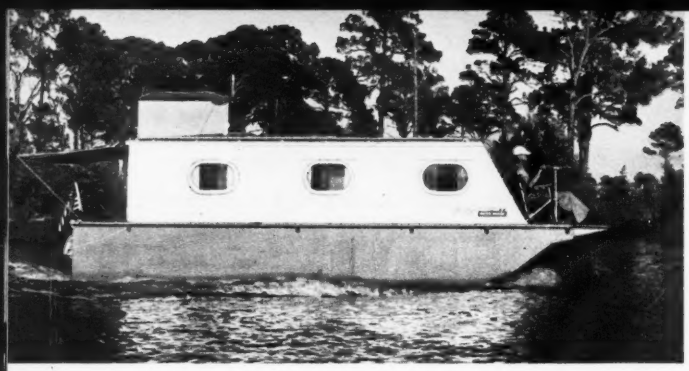
By Rube Allyn

WATER WAGON is the first member of a new family of boats designed to appeal to outdoorsmen everywhere. She combines the best features of a fishing cruiser, house trailer, hunting lodge, family picnic boat, and exploration vessel.

As a boat, she is surprisingly seaworthy. Her 5½-in. draft will enable you to explore behind islands and in coves no other boat can reach. You can go right across sand bars, thus sometimes cutting in half


OUTBOARD PROFILE
INCHES
FEET
12 6 0 1 2 3 4 5


BULKHEAD NO. 3
LINEN STORAGE
6" CLEATS-P&S
SEAT
BERTH
SEAT
DINING TABLE
SEAT
STANDARD WATER CLOSET
FORE DECK
DOUBLE REAR DOOR
SHELVES OR STORAGE
BULKHEAD NO. 2
BULKHEAD NO 1
ARRANGEMENT PLAN
FOLDING DECK EXTENSION
UP
SHELVES UNDER STOVE
SHOWER
BRASS BUTT HINGES 3"X4"
SEAT
BERTH
ICE BOX
SINK
STOVE
SHELVES
STORAGE
3" OR 4" CLEATS-P&S
WHEEL WELL UNDER BERTH
EAVES OVER ALL WINDOWS



Under way. Cruising on a river with full equipment aboard. The speed is 7½ mph with two of Evinrude's Fastwin 14-hp outboards.

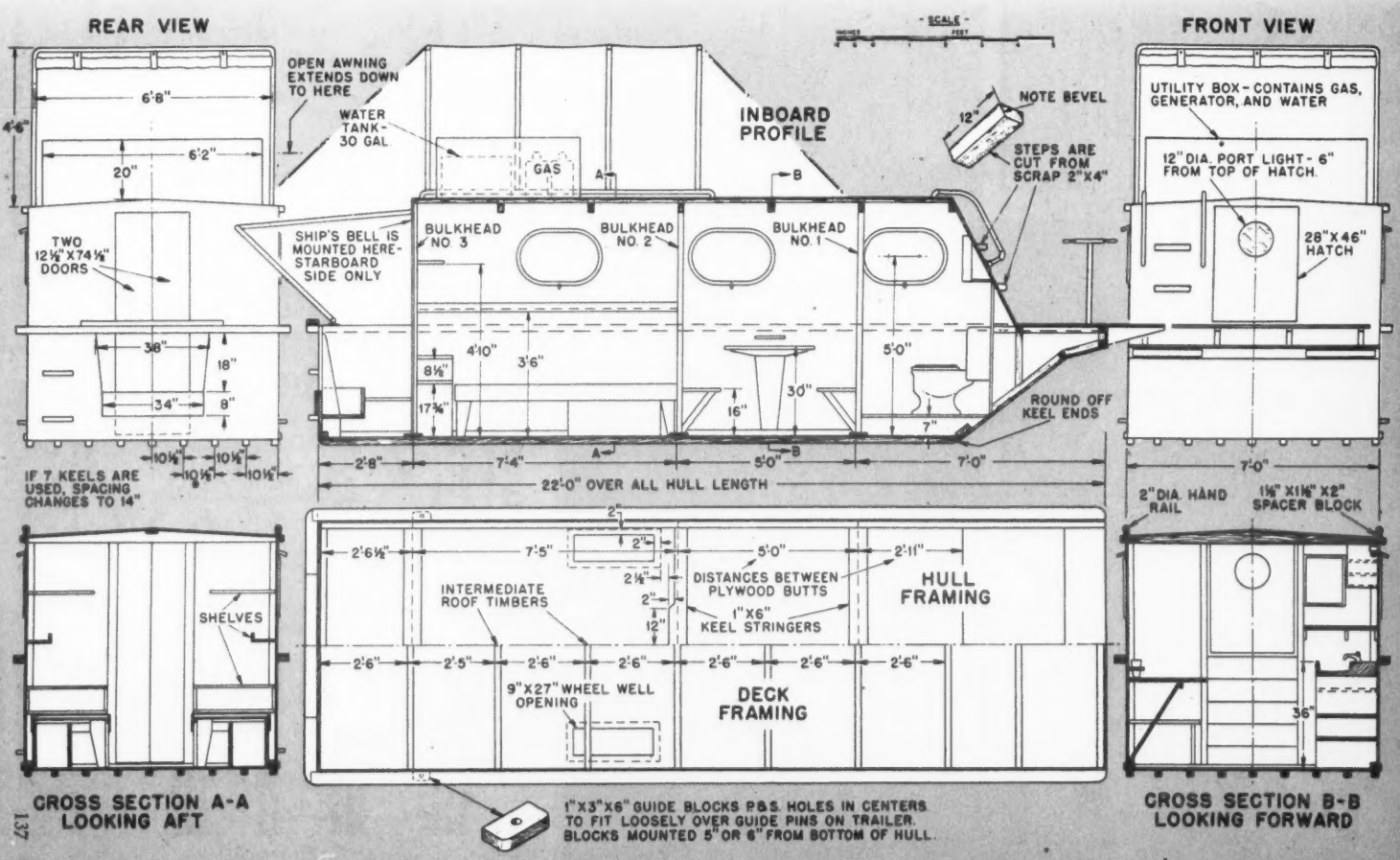
One man can pull the boat out of the water in 15 minutes or less. The trailer is backed into position and secured to the craft with pins and eyes.

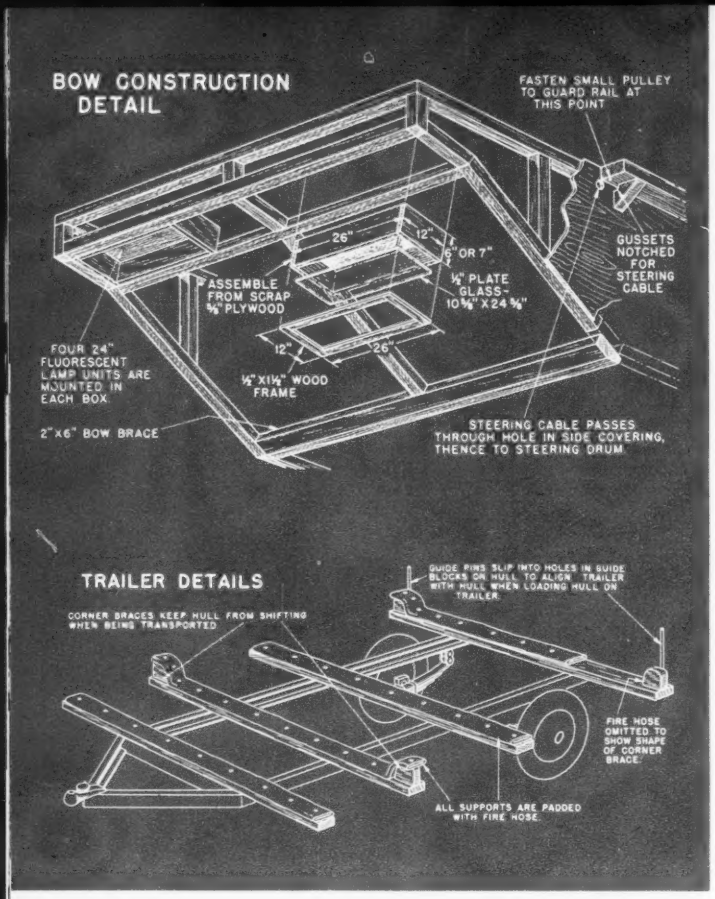
the running time on a trip. Adequate speed is provided by one or two outboard motors. With the remote motor controls now available, one person can handle Water Wagon; but she's fun to run even if you don't have remote controls—simply use a seagoing bell system and have one person in the bow to act as pilot and another in the stern as engineer.

If you like to go crabbing, you can tilt the motors up so the props are barely engaging the water and skim over the flats while sitting comfortably on the forward deck with a net, scooping up the crabs as you go. You can similarly use oyster tongs, a clam fork, or a shrimp net. For scalloping, you can walk beside the boat, picking shells as you go. When swimming, both shade and sun are available, and the bow can be nudged up on a sandy beach so you can swim from shore.

On land, Water Wagon can be towed at 45 mph with no swing or sway. Electricity, water, and waste lines can be installed in such a manner that they can be connected to outside installations. As a hunting or fishing lodge or a guest house, the boat can be set in a lake or on high ground. The trailer rig is so simple that one man can launch the boat in 30 seconds and pick it up in 15 minutes or less. Instead of hauling the boat onto the trailer by force, the trailer is floated into position under the boat and positively secured by pins and eyes.

Every inch of space in and on the boat is used. Elimination of bilges allows 6 ft. 6 in. headroom. Two people can sleep in the cabin. Hinged upper berths could be added to accommodate two more. On the house top, two more can bunk down on the utility box and still two more can sleep on folding cots. A well-appointed toilet room and an enclosed shower add luxury to utility. For lovers of the rod and reel who can't take the sun, the wheel wells can be used as inside fishing wells. Included in the accommodations are a comfortable dinette and a galley that has running water, a gas stove, and a 50-lb. icebox.


REAR VIEW
FRONT VIEW
SCALE
INCHES
FEET
OPEN AWNING EXTENDS DOWN TO HERE
WATER TANK - 30 GAL.
GAS
INBOARD PROFILE
NOTE BEVEL
12"
STEPS ARE CUT FROM SCRAP 2"X4"
UTILITY BOX - CONTAINS GAS, GENERATOR, AND WATER
12" DIA. PORT LIGHT - 6" FROM TOP OF HATCH.
28"X46" HATCH
6'8"
4'6"
6'2"
20"
TWO 12½"X74½" DOORS
SHIP'S BELL IS MOUNTED HERE - STARBOARD SIDE ONLY
BULKHEAD NO. 3
BULKHEAD NO. 2
BULKHEAD NO. 1
36"
18"
34"
8"
8½"
17¾"
4'10"
3'6"
16"
30"
5'0"
7"
ROUND OFF KEEL ENDS
IF 7 KEELS ARE USED, SPACING CHANGES TO 14"
10½"
2'8"
7'4"
5'0"
7'0"
22'0" OVER ALL HULL LENGTH
2" DIA. HAND RAIL
1½"X1½"X2" SPACER BLOCK
2'6½"
7'5"
2"
5'0"
2'11"
2½"
2"
12"
INTERMEDIATE ROOF TIMBERS
DISTANCES BETWEEN PLYWOOD BUTTS
1"X6" KEEL STRINGERS
HULL FRAMING
SHELVES
2'6"
2'5"
9"X27" WHEEL WELL OPENING
DECK FRAMING
36"
CROSS SECTION A-A LOOKING AFT
1"X3"X6" GUIDE BLOCKS P&S. HOLES IN CENTERS TO FIT LOOSELY OVER GUIDE PINS ON TRAILER. BLOCKS MOUNTED 5" OR 6" FROM BOTTOM OF HULL.
CROSS SECTION B-B LOOKING FORWARD



Large-Scale Plans

will ease construction. Send $4 to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Conn. Specify Plan B-212.

BILL OF MATERIALS

(Approximate Quantities Required)

Specify that all materials are to be used for boatbuilding. All plywood is to be exterior grade. All wood is to be dried to a maximum of 15 per cent moisture content and is to be select or B grade.

Plywood

Bottom: 5 sheets, 5/8" x 4'-8" x 8'-0"
Transom, Decking, and Doors: 4 sheets, 3/4" x 4'-0" x 8'-0"
Sides and House Top: 18 sheets, 3/8" x 4'-0" x 8'-0"

Longleaf Yellow Pine

Guard Rail and Transom Taffrail: 60 lineal ft., 2" x 4"
Keels: 180 lineal ft., 2" x 2"

Cypress

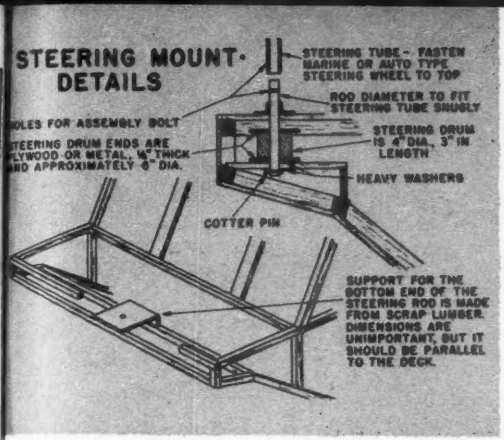
Stringers and Ladder: 6 pieces, 1" x 6" x 8'-0"
House-Top Beams: 7 pieces, 1 1/2" x 4" x 8'-0"
Framing and Chines: 100 lineal ft., 1" x 2"
40 lineal ft., 1 1/2" x 2"
120 lineal ft., 2" x 2"

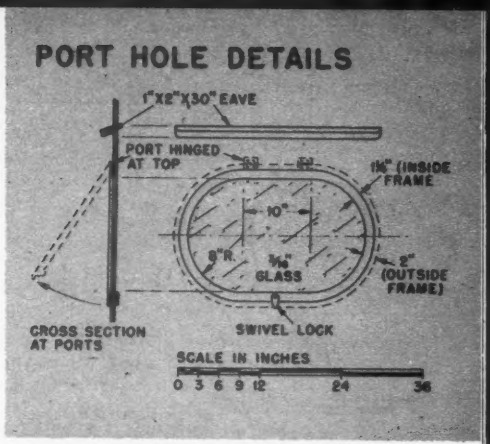
Fastenings

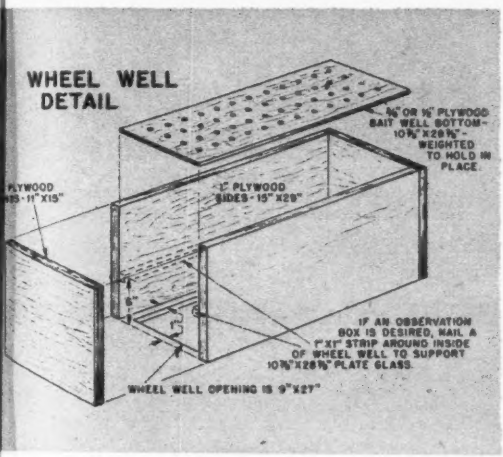
(Bronze, brass, or galvanized)
Bottom and Bulkheads: 45 dozen flathead wood screws, 1 3/4" No. 12
Sides, Bulkheads, and Trim: 58 dozen flathead wood screws, 1 1/2" No. 10
Inside Trim and Furniture: 24 dozen flathead wood screws, 1 1/2" No. 8
Bottom and Forward Deck: 4 dozen bolts, 1/4" x 4", with nuts and washers

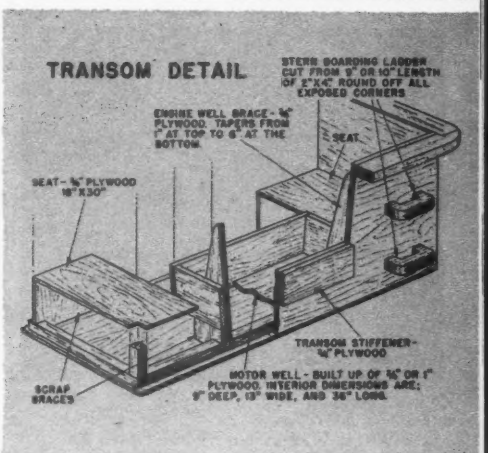
Miscellaneous

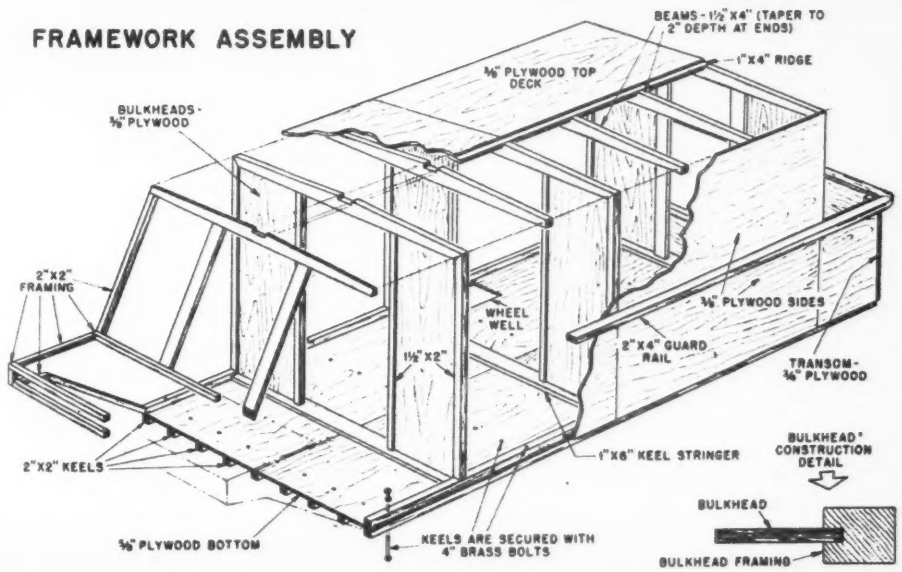
Four quarts of Weldwood glue
Seven pieces of glass, 15" x 21"
Eight brass hinges, 3" x 4"
Two cleats, 3"
Two cleats, 6"
Six blocks, 3", for tiller line
65 feet of airplane-type cable
Five quarts of yacht-white paint
Five quarts of shoal-green paint
Two quarts of antifouling copper paint
Water closet
Galvanized-metal shower pan to fit compartment
50-lb. icebox
Two banks of fluorescent lights, four 30-watt tubes each
Upper and lower canopies with pipe fittings
40 ft. of 3/8" copper tubing with fittings (including shower head, cut-off valve, and faucet)
Sink
Stove
40-gal. water tank

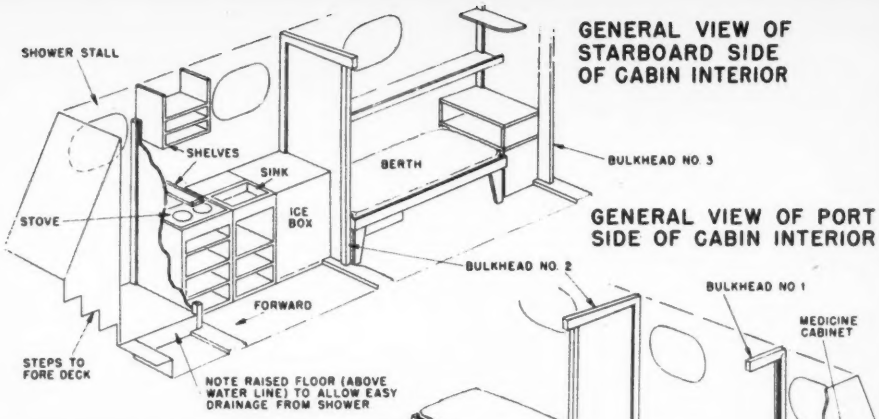

STEERING MOUNT-DETAILS
STEERING TUBE - FASTEN MARINE OR AUTO TYPE STEERING WHEEL TO TOP
ROD DIAMETER TO FIT STEERING TUBE SNUGLY
HOLES FOR ASSEMBLY BOLT
STEERING DRUM ENDS ARE PLYWOOD OR METAL, ¼" THICK AND APPROXIMATELY 8" DIA.
STEERING DRUM IS 4" DIA., 3" IN LENGTH
HEAVY WASHERS
COTTER PIN
SUPPORT FOR THE BOTTOM END OF THE STEERING ROD IS MADE FROM SCRAP LUMBER. DIMENSIONS ARE UNIMPORTANT, BUT IT SHOULD BE PARALLEL TO THE DECK.

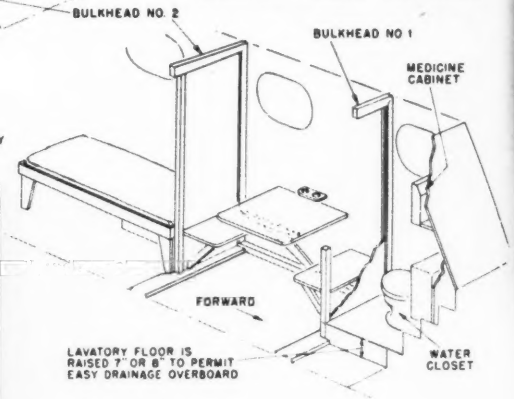

PORT HOLE DETAILS
1"X2"X30" EAVE
PORT HINGED AT TOP
1¼" (INSIDE FRAME
10"
8" R.
¾" GLASS
2" (OUTSIDE FRAME)
CROSS SECTION AT PORTS
SWIVEL LOCK
SCALE IN INCHES
0 3 6 9 12 24 36

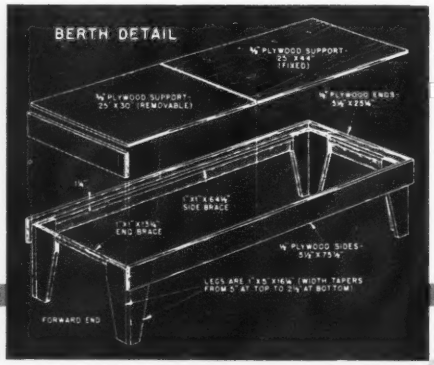

WHEEL WELL DETAIL
⅜" OR ½" PLYWOOD BAIT WELL BOTTOM - 10¾"X28¾" - WEIGHTED TO HOLD IN PLACE.
PLYWOOD 11"X15"
¾" PLYWOOD SIDES - 15" X29"
6"
IF AN OBSERVATION BOX IS DESIRED, NAIL A 1"X1" STRIP AROUND INSIDE OF WHEEL WELL TO SUPPORT 10¾"X28¾" PLATE GLASS.
WHEEL WELL OPENING IS 9"X27"


TRANSOM DETAIL
STERN BOARDING LADDER CUT FROM 9" OR 10" LENGTH OF 2"X4" ROUND OFF ALL EXPOSED CORNERS
ENGINE WELL BRACE - ¾" PLYWOOD. TAPERS FROM 1" AT TOP TO 6" AT THE BOTTOM.
SEAT
SEAT - ¾" PLYWOOD 18"X30"
TRANSOM STIFFENER - ¾" PLYWOOD
MOTOR WELL - BUILT UP OF ¾" OR 1" PLYWOOD. INTERIOR DIMENSIONS ARE: 9" DEEP, 13" WIDE, AND 36" LONG.
SCRAP BRACES


FRAMEWORK ASSEMBLY
BEAMS - 1½" X4" (TAPER TO 2" DEPTH AT ENDS)
1"X4" RIDGE
⅜" PLYWOOD TOP DECK
BULKHEADS - ⅜" PLYWOOD
2"X2" FRAMING
WHEEL WELL
1½"X2"
⅜" PLYWOOD SIDES
2"X4" GUARD RAIL
TRANSOM - ¾" PLYWOOD
2"X2" KEELS
1"X6" KEEL STRINGER
BULKHEAD CONSTRUCTION DETAIL
BULKHEAD
BULKHEAD FRAMING
⅜" PLYWOOD BOTTOM
KEELS ARE SECURED WITH 4" BRASS BOLTS







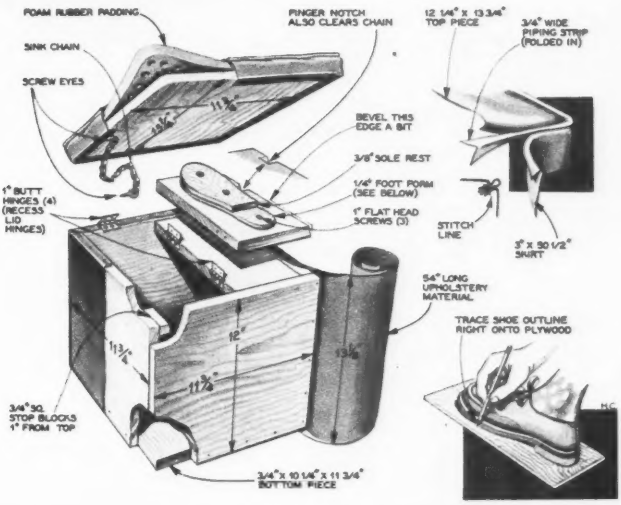
Water Wagon can be built with few tools. Having no curved lines, there are no planks to steam and bend. The building is a straightaway, square-corner job. Materials necessary are available in any town of medium size. None of the dimensions given is critical. Her bottom skin is laid upside down. Seven or nine 2x2-in. keels are spaced evenly across the bottom. Three 1x6-in. stringers running athwartships on the opposite side of the bottom from the keels serve as foundations for the bulkheads and as butt straps over the bottom-plywood seams. Secure the keels, bottom, and stringers together with 4-in. brass bolts. As shown on the hull-framing plan, the stringer under Bulkhead No. 2 is notched port and starboard for berth- [*Continued on page* 168]

Two persons can sleep on top of the utility box beneath the upper canopy. The tiny after cockpit can hold one or two trolling fishermen.

double-duty hassock

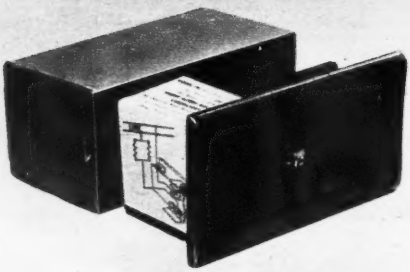
IF you're faced with the problem of a suitable place to store your shoe shining equipment, make this handsome hassock that hides its true function in life under a neat, upholstered exterior. Besides ample room for storing polishes and brushes, a hinged section folds up and back to make a shoe support for polishing.

Assemble the box of ¾-in. pine stock. The bottom fits inside the four walls. Cut a piece 5x12 in. and fit it inside half of the open top edges of [*Continued on page* 171]



The foot support is screwed to the bottom of the half lid which folds back against itself.

How the boxed cover is fitted to the padded lid. Foam rubber is used for the padding.



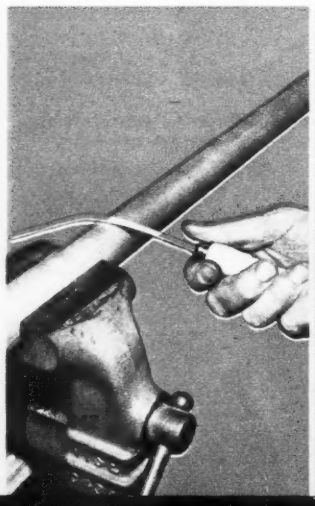
Newest type of thermostat fits flush against wall. Temperature is controlled by expansion of front plate against Invar bars mounted behind cover. Manufactured by Mulvaney Co. of Berkeley, Calif.

Marking tape consists of a carbon writing surface sandwiched between two layers of acetate to prevent smudging. Sticks to all surfaces without moistening. Labelon Co., Rochester, N. Y.

NEW for the SHOP

Mechanic's stethoscope, the Multiscope, is used for tracing and locating knocks in automobile and stationary engines. Plastic handle guards against electrical shock. Made by Herbrand Corp., Fremont, O.

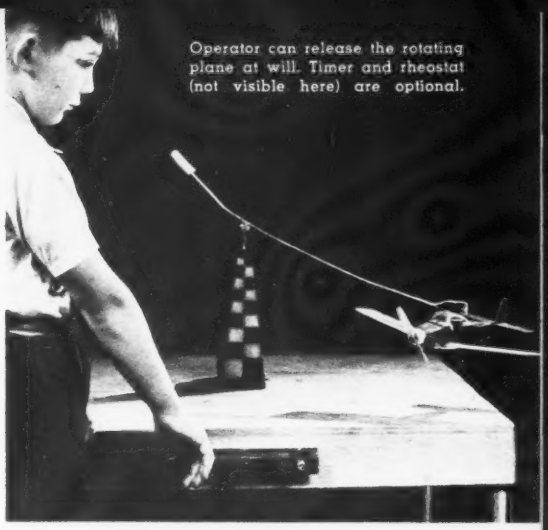
Flexible file can be bent to shape without snapping. Case hardened teeth are cut in spirals around soft inner core. Tec Imports, Van Nuys, Calif.



Paint-Boy directs wiped-off paint to inside of can instead of into rim. Marketed by Norton Labs, Lockport, N. Y.

Five position slip joint plier permits user to grip wide work with narrow handle span. Utica Tool Corp.

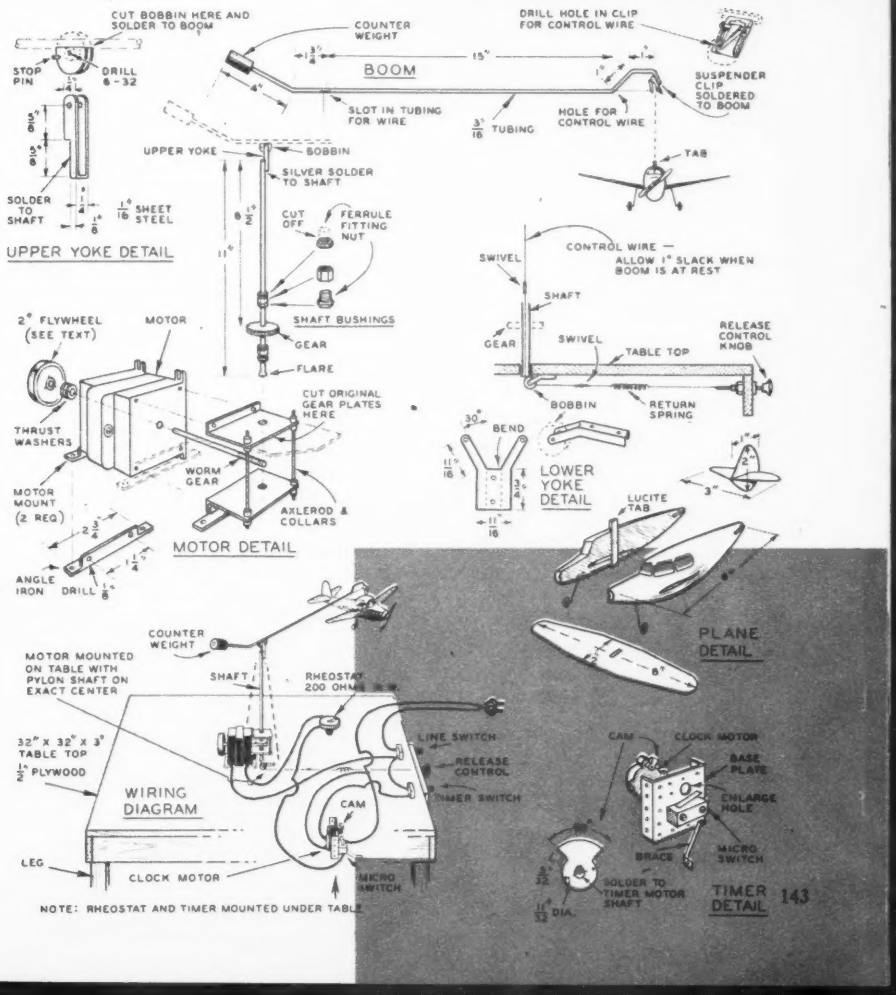
pylon plane



Operator can release the rotating plane at will. Timer and rheostat (not visible here) are optional.

AS toys go, planes mounted on a rotating boom are quite common, but this model is really unusual. In addition to take-offs and landings on its circular airstrip, you can release the plane from the boom in mid-flight, sending the plane into a realistic glide.

An Erector Set motor is used to power the [*Continued on page* 172]



Portable Cut-off Machine

THIS tool is powerful, easy to handle, and cuts clean and square. It will handle thin soft metal tubing without crushing it or the hardest solid metals just as readily. Yet it's simple to build.

Be sure that the swing table and mandrel are in perfect alignment if you wish a true cutting unit. The frame is constructed of 1-in. pipe. Rigid conduit is somewhat easier to bend. The simplest manner of bending the pipe is with a hydraulic bender if your local electrician or plumber has such equipment.

The bend was made in the center of each 5-ft. length. The top and bottom cross braces were then cut and the ends were ground to a curve to fit the side rails. Tack-weld these pieces in place, recheck the frame alignment, then complete the welds. The short cross piece in the top of the frame acts as a brace and a handle.

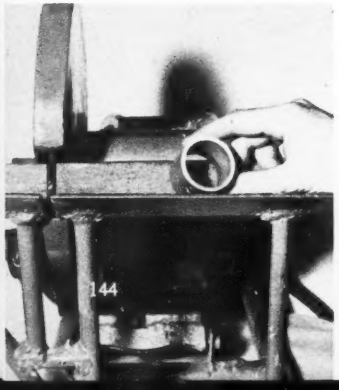
The mandrel housing was made from a piece taken from an old truck propeller shaft, the internal dimensions being sufficiently undersized so that the ends could be turned out for the bearings, leaving a stop shoulder inside the housing. Note the groove just inside the ends; this is for the snap retainer rings.

The sequence of parts in the shaft is as follows: a No. 203K ball bearing (Fafnir number) which is a standard generator bearing, felt grease retainer, retainer washer and retainer snap ring. A similar complement of parts applies to the pulley end of the shaft.

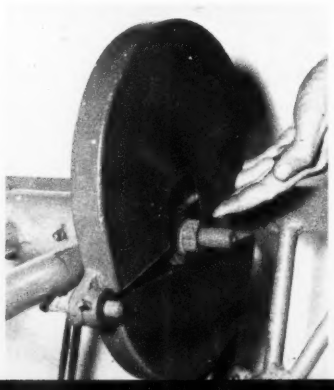
The two flanges are turned. The bore of one is turned to a press fit and the other is turned to a slip fit. Two cardboard washers should be inserted, one between each flange and the cut-off wheel.

A 5/8-in. lefthand thread nut and an Alemite or Zerk grease fitting complete the complement of mandrel parts. Next the top tubes are cut back to the desired length and the ends contoured to match the mandrel housing which must be squared with the frame both vertically and horizontally. [*Continued on page* 173]

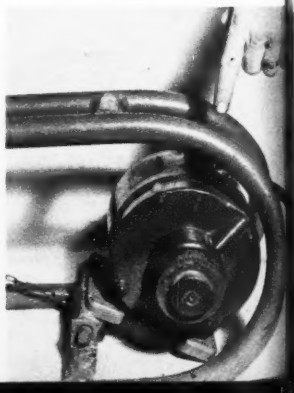
Lower support of the swing table is made of ½-in. pipe, couplings, and bushings.

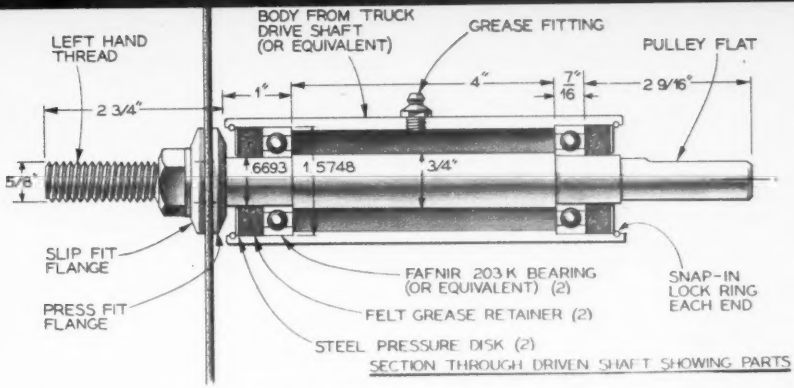


Wheel guard is positioned so that table will move over its front edge. Sides are of steel.

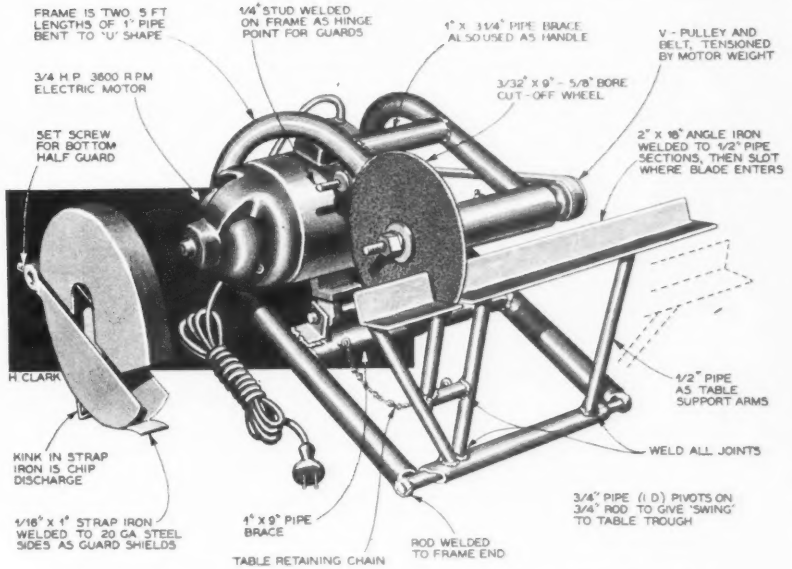


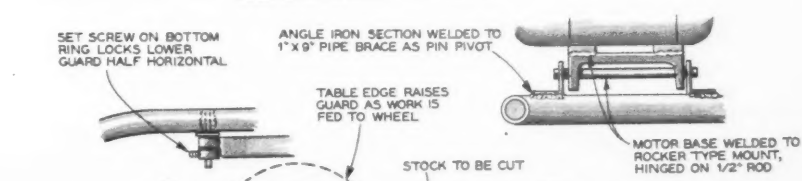
Two 5-ft. lengths of 1-in. pipe bent as shown form the frame. Note motor position.

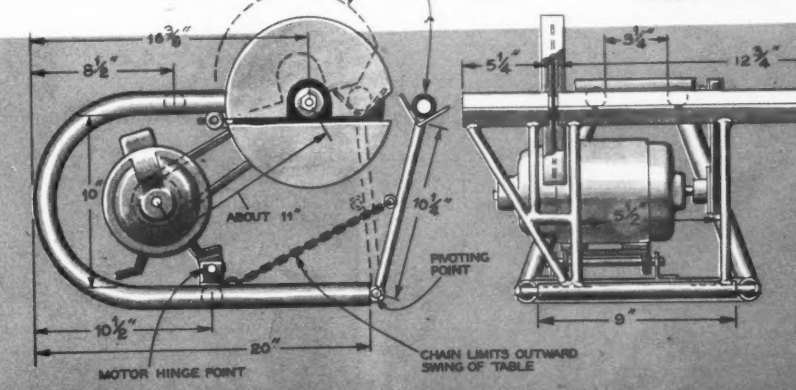




SECTION THROUGH DRIVEN SHAFT SHOWING PARTS

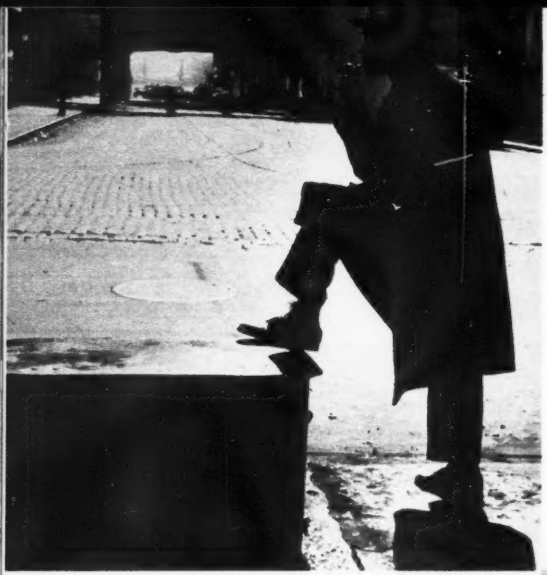






MONTHLY

PHOTO CONTEST



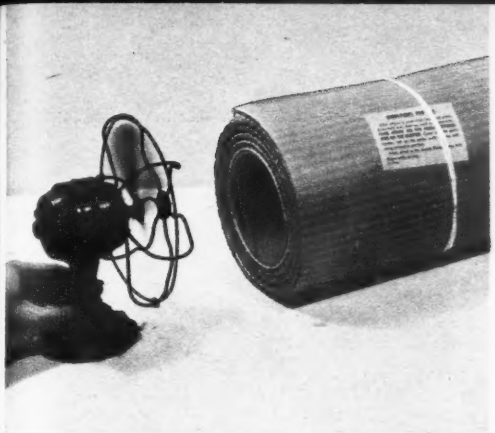
1st Prize ($10.00) .....Waiting
Taken late in the afternoon with a Rolleiflex by Leo Johnson of Flint, Mich.; 1/50th at f-11.

$5.00 Award .....Who Me
Carl Mansfield of Steubenville, Ohio, was out early in the morning for this shot.

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Please address your entries to: Photo Contest, *Mechanix Illustrated*, 67 W. 44th St., N.Y.C. 18

$5.00 Award .....Water Sprite
A photo by Commander Charles Van Dusen of the U. S. Navy. Exposed on Plus X at 1/100th and f-11.

$5.00 Award .....Smiley
Frank Meitz of Los Angeles, photographed this baby in sunlight with a reflector to fill shadows.

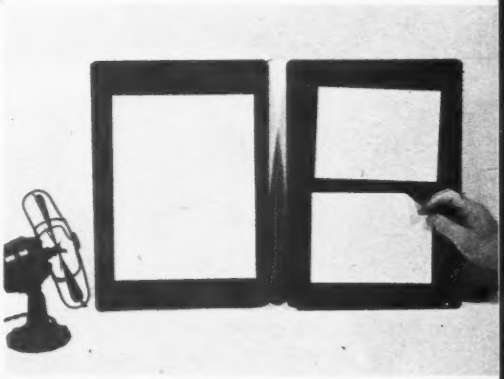


DRY 'EM IN A HURRY

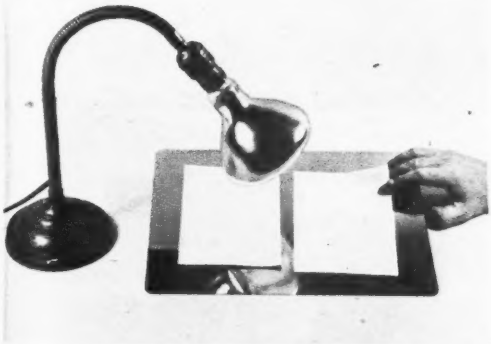
A stream of air from a small electric fan, directed through the corrugated binder of a blotter roll, will rapidly dry out the moisture from matte prints inside the roll. If the fan is adjustable, set it for its lowest speed.

COMMERCIAL photo-finishing plants use large rotary driers which take more electric power than an electric stove, for drying their prints. What can you use on a small scale in your darkroom?

If the prints are to be dried glossy, spread the ferrotype plates out on a warm radiator or around a warm air vent. During the summer a fan or an infrared lamp will do the job. A blotter roll is the best bet for drying matte prints. •



When drying prints on a ferrotype plate, the use of forced air drying produces less print curling than does forced heat drying. A gentle stream of air from a small electric fan does a good job with minimum curling.



An infrared heat lamp, set up in a table stand of any sort, is fine any time of the year for cooking the moisture out of glossy prints. Watch them carefully and to prevent singeing pick them off as they start to curl.

During the winter time, when there's plenty of heat in the room radiators, glossy prints can be popped off ferrotype plates in a very short time. The plates should be spotless and waxed before using and for the best possible results, all excess water should be removed with either a squeegee or print roller.

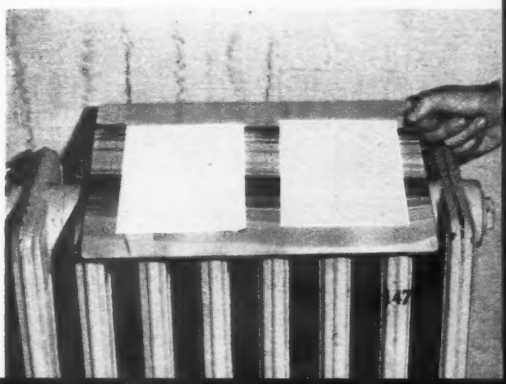
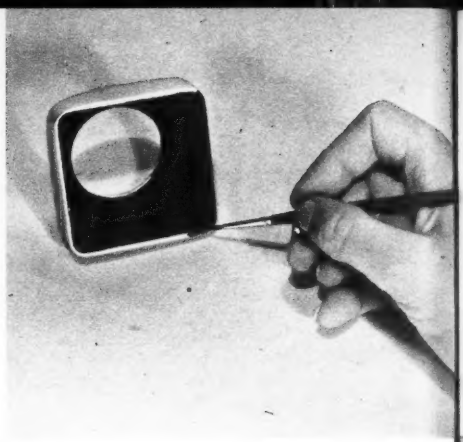


PHOTO WRINKLES

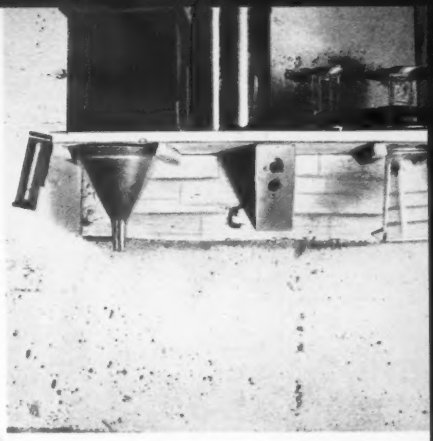


Lens shade edges often cause flares or streaks on your negatives when shooting copies or close-ups. This can easily be avoided by painting the unfinished outside edge of the metal lens shade with a coat of dull black lacquer or a flat black paint.

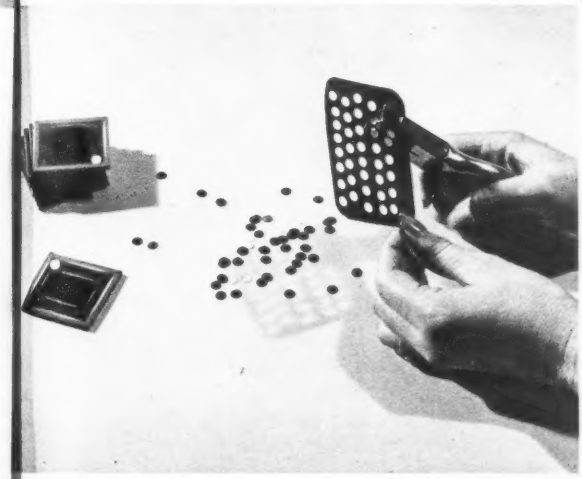
Paper clips come in handy as extra film hangers. Punch a hole in one corner of the negative and insert as shown in the photo. If you are developing film packs, an extra clip at bottom of the films will keep them from curling, thus avoiding water marks.

Laboratory clamp can be used as a clamp-on tripod and is small enough to be carried in your pocket. The clamp's thread is readily accepted by the camera's tripod socket and the design of the clamp permits the camera to be swung around in almost any direction for simplified picture taking.

Strips of wood, beveled and placed at the proper distance, can be used to hang darkroom funnels and graduates. The strips can be either nailed or screwed to the underside of your shelves. They will keep many useful darkroom items at hand.

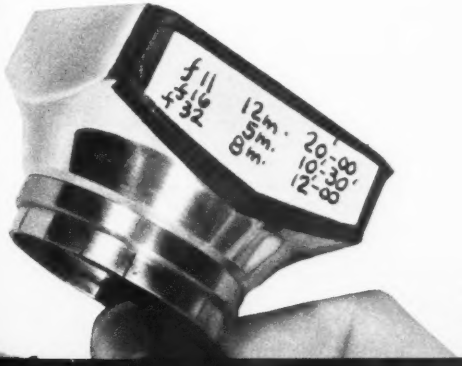


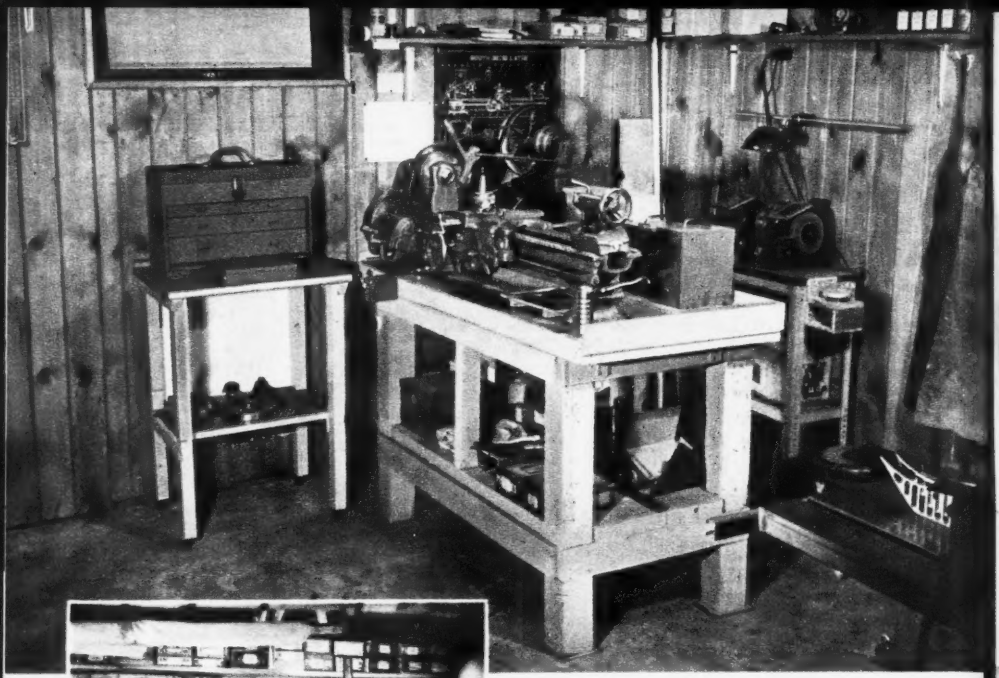
Identification stickers for marking sheet film holders or subject matter in film slide files, can readily be made by punching colored, gummed paper and fastening them to the holders or slides. They also keep your slides in the proper position, avoiding confusion when projecting.

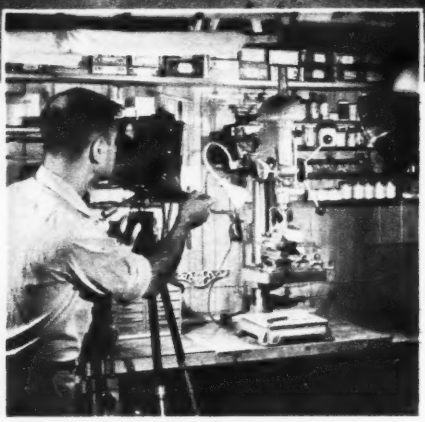


Thermometer holder can be made of a screw eye and cup hook. To avoid breakage they should be placed in a spot where they are not apt to be in the way. The cup hook should be located at bottom.

Hyperfocal distance table is kept handy by taping it to the top side of your lens shade. Exposure information, filter factors and film data can be similarly placed for ready reference when taking photographs.







Photograph Your Shop

By Robert Hertzberg

Taking clear, uncluttered photos of your shop is not difficult if you follow the hints in this story.

MAKING good pictures of your home workshop or other hobby activity is not much different from making good pictures of your girl friend, wife, or baby. It's a less troublesome job, for one thing, because the subject doesn't become fidgety while you are manipulating the lights and the camera, and it can't complain afterward about the final results! The pictures are not only a lasting record of your hobby but they can readily help pay off part of your operating expenses; good, clear photos of shops and craft projects are always welcomed by the editors of MECHANIX ILLUSTRATED and other magazines of the same nature.

Any camera with a focusing adjustment and an accurate view finder, or, better still, a ground glass back, is satisfactory. It should be supported

on a firm tripod, preferably one with an adjustable head to permit moving the camera up and down and sideways. For illumination, two regular No. 2 reflector floods, or No. 2 photofloods in aluminum reflectors, provide all the light needed in any home shop. Almost every amateur photographer has a couple of telescoping stands to hold these lights.

The accompanying photographs illustrate the wrong and the right ways to shoot the shop. They emphasize the need for observing these check points:

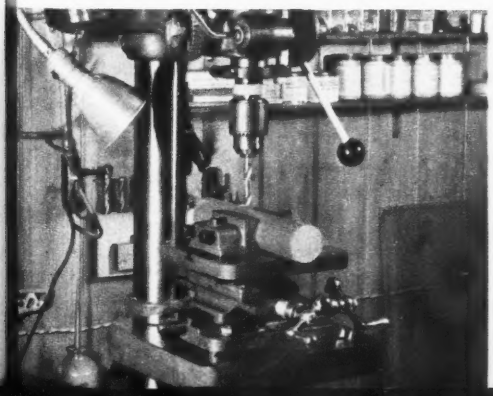
Lighting: Balance it on the scene so that shadows are minimized. If the camera is in approximately the center of the room, for instance, put one light on each side of and slightly in front of the camera position. Raise the lamps as high as possible on their stands, so that shadows are thrown downward. If well diffused lighting is used, harsh contrasts will be avoided. Always use a sunshade on the camera lens to prevent stray side light from fogging the negatives.

Camera position: For a general view of a whole side of a room, adjust the camera to about the center point between the floor and the ceiling. In this position, distortion of the vertical and horizontal lines near the edges of the picture will be kept at a minimum. Perfect alignment of these lines is usually possible only with a professional type view camera having a tilting and swinging back. Don't worry if doors and table legs appear to be leaning slightly inward. For close-ups of jobs or projects on top of a bench or on a machine, don't be afraid to raise the tripod and shoot from a high position. [*Continued on page* 185]

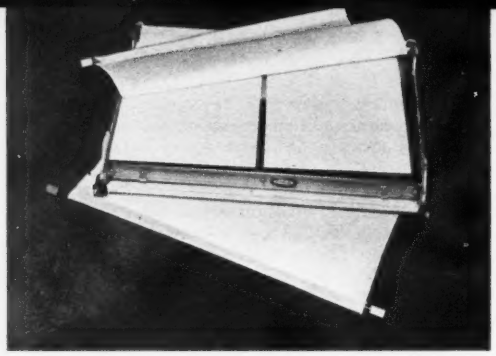
This is a nice, busy shop scene. The only trouble is that it is too busy. There's too much in the foreground and far too much in the background.

Here's exactly the same scene, cleaned up. The lathe bench has been cleared and a bed sheet has been hung in the background for a better shot.

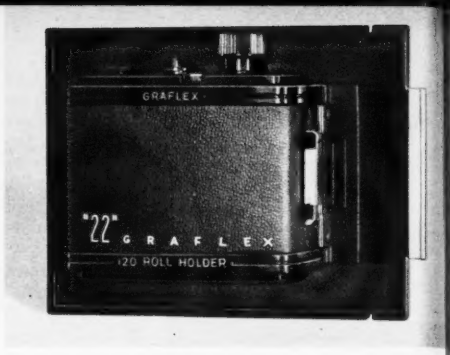
This picture is supposed to show how a milling vise is used. It is unsuccessful because of the confusing background which distracts the viewer.



By simply placing a large white card behind the unit to be photographed and adding a hand for action, the whole picture is greatly improved.



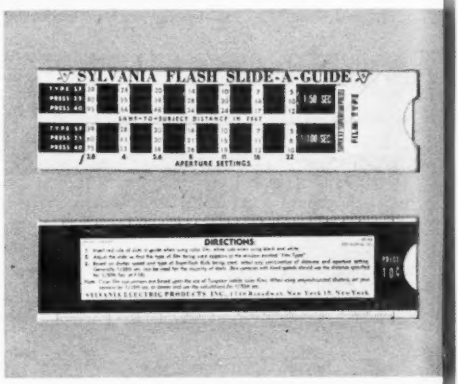
New duplex print dryer made by Fedco Products of New York City features two drying surfaces that will accommodate four 8x10 prints or equivalent in smaller prints on its two 11½x17½ in. platens. Consumes 125 watts. Canvas can be laundered.



Roll holder made by Graflex makes twelve 2¼x2¼ negatives or eight 2¼x3¼ on No. 120 film. New models announced fit 3¼x4¼ and 4x5 cameras with Graflox or Graflex back. Conversion kits available for cameras with standard Graphic backs.

NEW for the PHOTOGRAPHER

Portable slide viewer contains an automatic slide changer, a projection system and a daylight screen. Slides are projected 16 times their own size (4x magnification). Port-a-view uses a 50-watt lamp and an f-3.5 lens. Made by F. R. Corp. of N. Y. C.



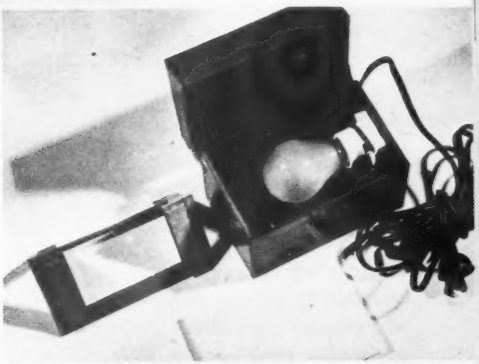
Pocket-sized flash calculator made by Sylvania Electric, called the Slide-A-Guide, determines proper aperture setting and shutter speed depending upon type of film and flash bulb the guide is set for. Can be used for black-and-white or color.

Sun-lite stroboscopic flash uses six standard flashlight batteries as a source of power. Will make at least 100 exposures, each equal in intensity to Press 40 at 1/400th.

Ektalux Flasholder, made by Eastman Kodak, features BC operation to flash the bulbs as well as trip the shutter. Gun is wired for extension units; will fire seven lamps in synchronization.

Left: The viewer is simple to use and takes up a minimum of desk space, an important item to consider when showing any color transparencies.

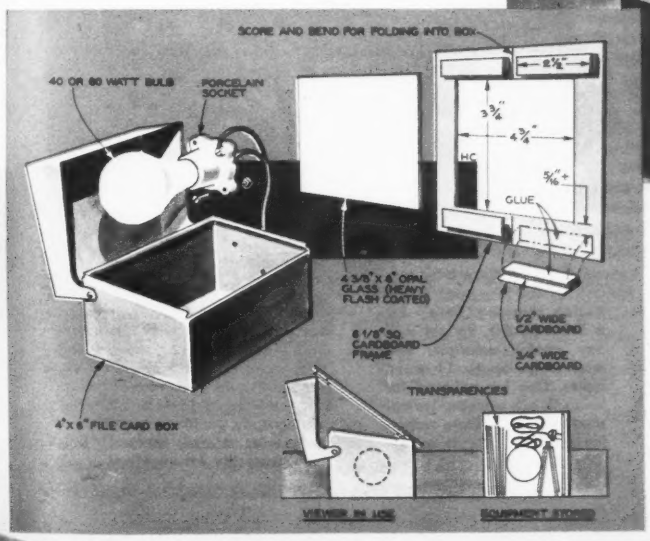
Below: The viewer consists of a metal card file box, a sheet of opal glass, some heavy cardboard and the necessary electrical equipment and wire.



4x5 Transparency Viewer

Metal card file box makes an inexpensive and lightweight color transparency viewer.

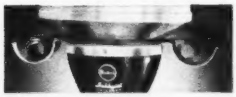
By Bob Wolber



The opal glass is placed in position behind the cardboard mask. This keeps the cardboard which is scored for bending, stiff. The inside of the box should be painted white for good reflection to get the most out of your light. A 40 or 60-watt bulb will do the job. The mask, glass, wire and your color transparencies can all be carried in the box.

Modestly Priced Kodak Hobbyist Enlarger—$44.00. A good enlarger lets you accomplish much more than just make a big picture from a tiny negative. You can select the ideal portion of your picture . . . eliminate unwanted areas . . . make the enlargement even better than the original print. The "Hobbyist" uses "cold light" illumination—perfect protection for negatives. New integrating-sphere lamphouse assures even light distribution. Includes Kodak Enlarging Ektanon Lens, 89mm. f/6.3 (Lumenized), with click stops. For negatives through 2¼ x 3¼ inches.

Easy to Set Up. Rapid assembly of the Hobbyist Enlarger gets it into action fast. Disassembles with equal ease for convenient storage where space is limited.

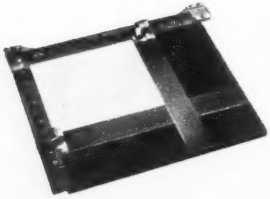


New Negative Carrier. Greatly simplifies loading. Circular in shape, rotates easily. Sizes for 35mm. up through 2¼ x 3¼. One comes with each enlarger. Cups extra.

HOW TO SET UP A DARKROOM

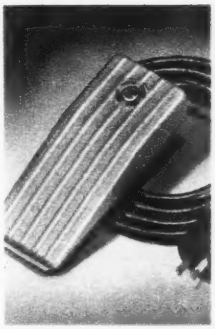
Taking the picture is only half the fun. Developing and printing—and making your own enlargements—can double your rewards in photography. You can set up a darkroom on a modest budget—for as little as the price of a Kodacraft outfit (see facing page). And, for less than $50, you can add a fine enlarger complete with lens. On these two pages you see a wide choice of equipment, all reasonably priced. How much you spend on your darkroom is just a matter of how far you want to pursue this fascinating hobby. Why not see your Kodak dealer about it? His professional advice will help you start off right and keep within your budget.

New Kodak Enlarging Ektanon Lens, 50mm. f/4.5—$14.00. All elements are *Lumenized*. Iris-type diaphragm has click stops down to f/16. There are eight Kodak Ektanon and Ektar Enlarging Lenses for enlargers that take negatives up to 4 x 5 inches. They are all *Lumenized* (hard-coated) and designed for maximum correction at close working distances. Let your Kodak dealer help you select the one best suited for your needs with the Kodak Flurolite Enlarger (see at right).

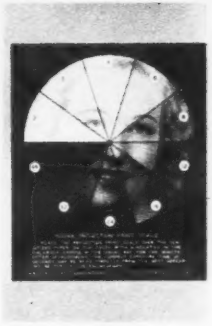


Kodak Masking Easel, 11 x 14—$9.60. For use with any vertical enlarger. Will mask prints up to 11 x 14 inches. Can be adjusted for ¼- to ¾-inch margins. Spring-steel hinges facilitate adjusting print size.

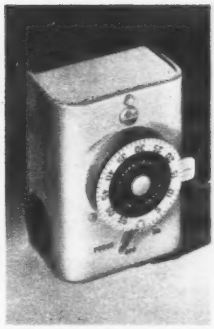
An Advanced Enlarger—The Kodak Flurolite—$99.50 (without lens). Does much more than enlarging. With accessories the 2¼ x 3¼-inch "Flurolite" quickly converts for copying, cine-titling, slide-making, close-up photography, photomicrography, and for use as a view camera. "Cold light" protection for negatives.



Free Your Hands with the Kodak Utility Footswitch —$10.00. Controls enlarger, printer, or safelight. Attaches to floor, or to vertical support for operation by knee pressure. Low-intensity neon light clearly marks its location.



Save Paper and Time—Kodak Projection Print Scale—$1.15. This is a transparency divided into 10 sectors of varying density, each indicating a different printing time. Full instructions guide you in choosing best exposure time.



For Precise Timing—Kodak Electric Time Control—$13.50. Plug printer or enlarger right into control for automatic timing from 1 to 57 seconds. Repeat timing possible. Continuous light for accurate focusing is provided for your convenience.

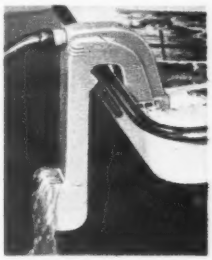
Spring-Wound—Kodak Timer—$6.75. Has both minute and split-second hands. Covers all intervals from ½ second to 60 minutes. Can be stopped and restarted without resetting hands. An added feature is the handy tilting base.

ON A MODEST BUDGET

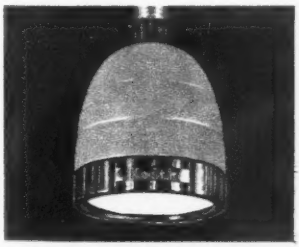
Inexpensive Printing Materials—Kodacraft Printing Kit—$4.30. Includes three 5 x 7 trays, printing frame, Kodak Velite Paper, graduate, Kodak Tri-Chem Pack, thermometer, stirring rod, book of instructions.

For Developing and Printing—Kodacraft Photo-Lab Outfit—$7.45. Contains new Kodacraft Roll-Film Tank with 620-120, 616-116, and 127 roll-film aprons; Kodacraft Printing Frame; other accessories.

Includes Printer—Kodacraft Advanced Photo-Lab—$12.10. The contents of this photo-lab can all be packed in the metal printer. The printer takes negatives up to 4 x 5½ inches. Includes all other essentials.



Washes Prints Automatically—Kodak Automatic Tray Siphon—$4.50. Washes films, too. Converts ordinary tray into effective washer. Attaches to water tap. Hypo-laden water is continuously siphoned off.



You Need One of These—Kodak Darkroom Lamp—$4.70. Use in wall socket or from a drop cord. Includes a Kodak Safelight Filter and uses 15-watt bulb. Kodak safelight lamps screen out photographically dangerous white light and provide safe working illumination. There's a wide selection available, with prices as low as $1.00 for the Brownie Darkroom Lamp, Model B. The Brownie Darkroom Lamp Kit, complete with Series 0, 2, and 3 safelight cups, only $1.75.

Prices subject to change without notice

Your Kodak dealer will be glad to demonstrate this equipment for you. See him for *all* your photo needs.
EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

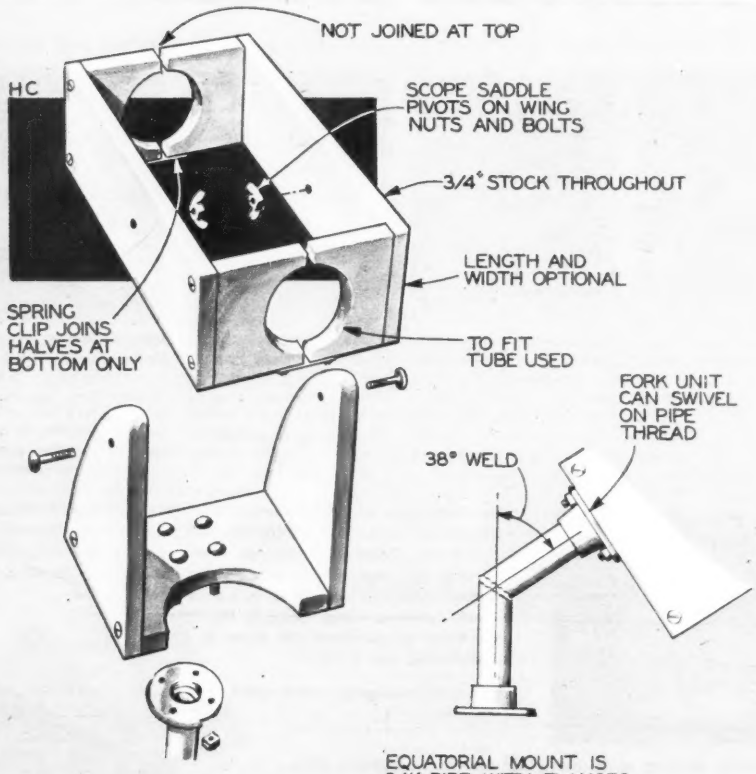
Kodak
TRADE MARK

The Amateur Telescope Maker's Page

A Refractor Mounting

REFRACTORS come in for their due share of attention as witness the work of Eugene Bachman of Evansville, Ind. His letter follows:

I am a third year physics major at Evansville College and am quite interested in amateur telescope making. Here are some pictures of my first project, made with Brownscope [Continued on page 192]



Bicycle Repairs

[*Continued from page* 132]

you need more grease inside, *Not Oil.* Sometimes a few drops of kerosene in the oil hole will stop such a squeak. Putting oil in the oil hole, odd as it may sound, just acts as a solvent for the grease, washing it out of the brake, leaving no lubrication at all.

Bendix Brake. Start taking the brake apart from the arm side. As you remove the parts set them down in order. Remove the threaded lock washer, arm, and dust cap. Holding the exposed end of the expander so it doesn't fall out, turn the wheel over and unscrew the axle, with lock washer and adjusting cone attached. Unscrew the drive screw and sprocket assembly and remove the two ball bearing retainers. The remaining parts can then be slipped down with the expander.

Clean all the parts well. If the brake shoes are worn smooth, or if the ridges on the tapered surface of the driving clutch are shiny, the part should be replaced. Press the clutch into place inside the springs of the retarder assembly. It should be held firmly by the retarder spring. If the springs seem loose, bend each spring leaf inward a small amount, remembering that the clutch still has to fit inside the springs. If the springs seem very weak, the entire expander and retarder assembly will have to be replaced. Inspect the teeth on the bottom edge of the clutch and the corresponding teeth on the retarder; if either is worn, the piece should be changed.

Here are some troubleshooting pointers for the Bendix brake. When the pedals on your bike slip forward or backward, the retarder spring is not tight enough, the grooves on the driving clutch are worn, or the teeth on the clutch or the retarder are worn. If the brake does not stop quickly enough, chances are that the brake shoes are worn out.

Grease all the parts, and you are ready to reassemble the brake. Mount all the parts, from the ball retainer to the driving clutch, on the expander. The grease will hold them together while you slip the assembly inside the hub, from the side opposite the taper in the hub. Be sure all bearings are reassembled with the open side facing the center of the hub.

Final adjustment of cone tightness is made by turning the brake arm before tightening the lock washer.

Musselman Coaster Brake. The disassembly of the Musselman Coaster Brake is, in many respects, similar to the previous outline. If there is no locknut on the adjusting cone, you can start taking the brake apart from the sprocket side; if the cone has a locknut, start on the arm side of the brake. Remove the lock nut, arm, and dust cap. Holding the exposed part of the stationary cone so it doesn't fall out, turn the wheel over, unscrew the axle and sprocket and remove the large ball retainer. The remaining parts will drop out. The large retainer on the drive screw is held in place with a ferrule, which may be pried off.

Check the tension of the drag spring. If the clutch is loose in the drive spring, bend the leaves in a bit. If they bend very easily, the entire spool and drag assembly should be replaced. Inspect the ridges and teeth on the clutch and the teeth on the drag. If they are worn or shiny, the part should be changed. Check the brake shoe and the wedge for cracks.

Clean and grease all the parts, and you are ready for assembly. Start by mounting all the parts, from the large retainer to the clutch, on the stationary cone. The grease will hold them together until you insert the assembly into the hub, from the large end. Final cone adjustment, as described before, is done by moving the arm before the locknut is tightened.

The New Departure Coaster Brake. Pay particular attention to the relative position of parts, so that you will know where the pieces go when you are ready to put the brake together again. Remove the locknut, arm, and dust cap. Holding the exposed part of the disk support sleeve so it doesn't fall out, turn the wheel over and unscrew the axle, sprocket and the large retainer. The remaining parts will slip out. Clean all the parts well.

You should have 21 disks, 11 with round outer edges and almost square inner edges, and 10 with circular inner edges and three lugs on the outside. If the set is not complete, or if you find that you have only 11 (the old Model C brake disk set), the set should be replaced. Replacement of the disk set is also indicated if any of the edges of the disks are upset, or if any of the lugs are worn or missing. Inspect the ridges on the clutch sleeve, and the teeth on the clutch and on the bottom of the clutch sleeve. If they are worn or shiny, the part should be replaced. Look at the tongue of the transfer spring; if it is deeply grooved, or if the tongue is broken off, the spring should be replaced. Before getting another spring, be sure of the type you want. If the spring you have is flat, or if the spring seat on the clutch is flat, you need a Model C spring. If the spring and seat are concave, you want a Model D spring. Remember that

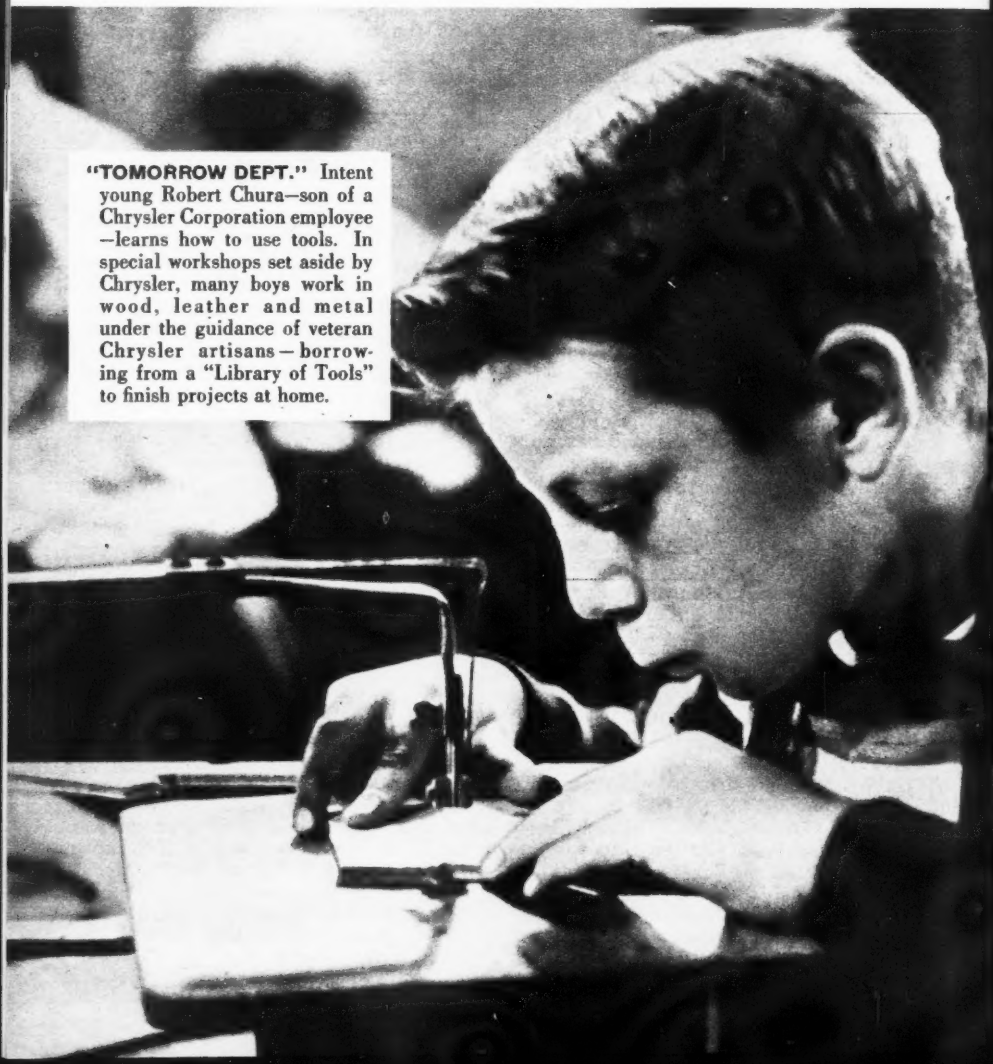
[*Continued on page* 164]

U.S. PRODUCTION DRIVE TURNS SPOTLIGHT

Chrysler Corporation's program helps people build better products and better careers for themselves

George Heyer, noted magazine photographer, turns his camera for this picture story on a program of importance to American production — how people learn to build new jet engines and military vehicles, and the cars and trucks that play a vital part in American life.

Heyer's pictures were made in Chrysler Corporation factories, classrooms and training shops. He shows a few of the thousands of men and boys now taking part in Chrysler's widespread training and technical education program.



"TOMORROW DEPT." Intent young Robert Chura—son of a Chrysler Corporation employee —learns how to use tools. In special workshops set aside by Chrysler, many boys work in wood, leather and metal under the guidance of veteran Chrysler artisans — borrowing from a "Library of Tools" to finish projects at home.

ON TRAINED MEN

CLASS IN JETS. These men are learning supervisory jobs for jet engine production at the Navy-owned Chrysler Jet Engine Plant in Detroit. Engineer J. E. Engstrom is teaching the latest in jet design. Like most Chrysler Corporation officials, these men came up from the ranks.

"GOOD MACHINES DESERVE GOOD MEN." Albert Bazner learns about grinders from machinist H. A. Nelson. Albert is a Chrysler Industrial Education apprentice, learning a trade—at good pay. In other courses, high school and college students earn both classroom credits and pay.

THEY THINK IN CLAY. At Chrysler Institute of Engineering, employee students D. M. Holiday, *left,* and Paul R. Diehl study body design with engineer Carl Hood. The Institute offers courses that compare with those in leading engineering colleges. At Chrysler, employees find training to improve themselves . . . become more valuable to America now when production need is great.

CHRYSLER CORPORATION

PLYMOUTH, DODGE, DE SOTO, CHRYSLER CARS & DODGE TRUCKS

Chrysler Marine & Industrial Engines • **Oilite** Powdered Metal Products
Mopar Parts & Accessories • **Airtemp** Heating, Cooling, Refrigeration • **Cycleweld** Adhesives & Building Panels

[*Continued from page* 122]

the sudden rotation of the cranking motor's shaft causes the pinion of the Bendix drive to travel forward on a triple threaded screw shaft to mesh with the ring gear. It is really the inertia of the drive pinion in this system which results in the meshing.

When the starter switch is conveniently placed on the instrument panel and the system utilizes a Bendix drive, a magnetic switch is employed so that current from the battery to the cranking motor can pass directly and through contacts heavy enough to handle the load. Such a switch is similar to a relay for headlights, the comparatively low current flowing through the starter button circuit controlling the electrical switch which makes the more direct contact to handle high amperage. A solenoid is a similar device except that in addition to closing the cranking motor circuit it shifts the drive pinion magnetically.

When a motorist finds it necessary to lift the hood and press the end of the rod emerging from that coil-like unit atop the starting motor, he is simply giving a lift to an ailing solenoid. When you see him placing the car in gear (ignition off) and rocking it back and forth he is just trying to shake loose a jammed Bendix drive gear. Weak current can bring on either of these conditions.

To make more certain the solenoid will cooperate, a relay is used when the driver touches the push button control or when the automatic controls are brought into action. We find two varieties here. One—the ball type—is a vacuum switch built into the carburetor, a steel ball doing the actual work of opening and closing the solenoid circuit. When the driver presses on the accelerator pedal to start, the ball goes up against a plunger to force a contact spring between the terminals of a switch. Vacuum then lifts the ball up as soon as the engine starts. If the engine should stall, and the throttle return to the idling position, the re-start is made simply by pressing the pedal again.

Then there is the diaphragm type of vacuum switch to provide the automatic control. It is a spring-loaded flexible diaphragm connected to the intake manifold on one side and to the switch contacts by means of mechanical linkage on the other. Thus when the driver turns on the ignition and presses the clutch pedal there is a complete circuit to the relay for operating the solenoid. As soon as the engine starts the vacuum switch breaks the circuit.

With these close-ups clearly in mind the question arises as to what you or I can do to prevent starting trouble. Something that doesn't occur to many drivers is the fact that some starting systems are used two or three times as much as others for the same distance traveled. That's why women have more trouble with engine starting systems than do men because the ladies make shorter runs around town. Motor stalling increases the wear and tear on starters too, not to mention the habit of using the starter (car in gear) to pull out of the way of traffic when the motor stalls and won't start. Much basic trouble in starting is due to wear on the flywheel ring gear. Chipped gears may be due to carelessness in operating the starter or failure of the starting system parts which are supposed to prevent accidental engagement of the pinion with the ring gear, or failure of the pinion to disengage instantly when the engine goes into action.

That copper disk or bar which the solenoid moves into a position for making contact between the battery and the starting motor is likely to become corroded or pitted because of the heavy current passing through it. When this happens the starting motor acts as sluggish as it would with a weak battery. This disk can be cleaned up for continued service. However, when such contacts are reconditioned it usually is necessary to re-check the pinion's travel. Remove the pin from the solenoid's plunger and push the latter fully forward taking the lash out of the overrunning clutch by pressing on its shell. Finally, when the pinion is ⅛ inch from the housing, insert the pin at the forward end of the slot.

Much simpler is the remedy for a starting motor that gives a "tug" and then quits each time you press the starter button. When this happened to me one winter morning I discovered that the end of the battery cable was slightly loose where it connects with the hot post of the starting motor. So heavy was the current load the wire pulled away enough to break the circuit.

Much of what happens to the starting motor is similar to ailments contracted by the generator. Too many owners assume that all starting motors are fitted with oilless bushings. Even these need a few drops of light oil whenever the unit is disassembled for service. However, many starting motors need 8 to 10 drops of light engine oil every 5,000 miles—more often if the engine has to be started excessively. Where grease cups are used turn them down one turn every 5,000 miles. Some of these motors have oil wicks which should be saturated whenever the unit is serviced. But don't go into a frenzy of

[*Continued on page* 162]

THE PROUDEST MAN IN MOTOR-CYCLING OWNS A HARLEY-DAVIDSON

Thrills! Travel! Adventure!

WITH A

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Car Care

[*Continued from page* 160]

oiling if you suddenly discover that the starting motor on your car does need lubrication, for excessive oiling may cause gumming of the commutator.

You may have heard otherwise but Bendix drives and Dyer drives (a heavy duty pinion type used on Diesels and heavy duty gas engines) should get a small amount of light engine oil whenever the drive is removed for servicing, *but no heavy oil or grease.* If your car has an overrunning clutch drive no additional lubrication is needed, the unit has been packed at the factory. Be sure to keep lube off the commutator of the starting motor. A light glaze and some dirt are natural enough, and can be removed by cleaning with a strip of No. 00 sandpaper held against the commutator while the cranking motor is being operated with the ignition turned off.

With a Bendix drive, the operator always should be careful to wait until the engine has completely stopped before restarting a stalling motor. If he presses the starter button while the engine is "rocking" he may wrap up the Bendix springs or break the housing. A backfire may also cause such trouble. You can prevent this by not having the ignition timed too far in advance and by avoiding a too lean mixture.

A good quick test of the cranking motor is to turn on the headlights to see first of all if the battery is strong enough to give brilliant lighting. If the lights are okay then start cranking and watch the effect on the lights. If they go out the chances are there's a poor connection between the battery and the cranking motor, but if the lights merely dim then check the battery. If the battery is okay the engine may be stiff due to cold or heavy oil. But if there is no such condition then the starting motor needs inspection. It may have a bent armature shaft, worn bearings or loose pole shoe screws.

If the lights stay bright, but there is no cranking, there's an open circuit probably in the control circuit including the relay and the solenoid. You will need a jumper lead to span the solenoid's main terminals.

Let's hope that by keeping these points in mind you will be among those who find that the starting motor goes merrily into action with or without the lights on, and without the lights dimming.

But this is merely for purposes of testing. In practice it always helps the battery as well as the starting system to have the lights switched off (that goes for the heater and radio too) when touching the little button that says "We're off!" •

OUR WALLS MADE ME WAIL!
UNTIL I DISCOVERED GOLD BOND COLOR TEXTURE!
YES, WE HAD DRAB, DULL, DINGY OLD WALLS!
BUILD BETTER WITH
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I ASKED MY NEIGHBORHOOD DEALER WHAT TO DO. HE TOLD ME ABOUT AMAZING GOLD BOND COLOR TEXTURE...IN EIGHT NEW COLORS!
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You'll build or remodel better with
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Bicycle Repairs

[*Continued from page* 157]

the projecting tip of the tongue faces away from the clutch teeth.

Grease the bearings and all other parts, not forgetting the small retainer inside the sprocket lock nut. All the parts that fit inside the hub should be greased, except the disks. These are to be oiled with No. 30 oil. When reassembling the brake, be sure the bearings are facing the right way, as shown in the drawing. Assemble all the parts, from the large retainer to the clutch sleeve, on the disk support sleeve. The disks are alternated, starting with a round one, then one with the three lugs, then a round one, etc. You should end up with a round disk. Be sure the tongue on the transfer spring enters the slot on the side of the clutch sleeve. Use a straight-edge to line up the lugs on the disks. Hold the wheel on edge, so that the tapered side of the hub is away from you and so that you can see the grooves in the hub. Slide the disk assembly into the hub, being sure that all the disk lugs enter the three grooves in the hub and the bearing seats in the hub race. Then, holding the support sleeve so that it won't fall out, turn the wheel over and replace the retainer, sprocket, and axle. Replace the dust cap, arm and lock nut. After adjusting cone tightness, lock the arm in place.

When you are ready to replace the wheel, first set the chain around the rear sprocket, then slide the wheel into the frame of your bike. Start the chain on the bottom of the front sprocket, turn the pedals forward, and the chain will ride into place. Replace the parts on the rear axle, don't forget the clip on the brake arm. Tighten the chain adjusters until there remains about one inch of play in the chain and the wheel is centered in the frame.

The chain should be lubricated occasionally with a mixture of graphite and light engine oil. Work mixture into links; wipe off surplus.

One word of caution. If something doesn't fit right, look the part over to be sure you have put it together correctly. Don't force anything. All parts should fit easily and smoothly. If you have very much trouble, rather than ruin a part or the whole brake, take the wheel to a repair shop, and let them find out what is wrong. Good brakes mean safe driving. Have fun, but play safe! •

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In the waters of the Truckee River . . . in the famous fishing spots of outdoor America . . . *anywhere* and *everywhere* that fishermen fish—and catch 'em . . . you'll find H-I tackle *preferred* for its quality, dependability and value. *Buy H-I—at your dealer's.* Horrocks-Ibbotson Company, Utica, N.Y. Manufacturers of the largest line of fishing tackle in the world.

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HORROCKS-IBBOTSON CO., UTICA, NEW YORK

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Two DREMEL *Electric* SANDERS *with*

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OUTSTANDING PERFORMANCE FEATURES (In both models) Only 2 moving parts; 14,400 strokes per min., easy one-hand operation; dustproof—foolproof; 10-second paper change; 110-120 V., 60 cycle A.C. PLUS mirror-smooth, straight-line sanding action.

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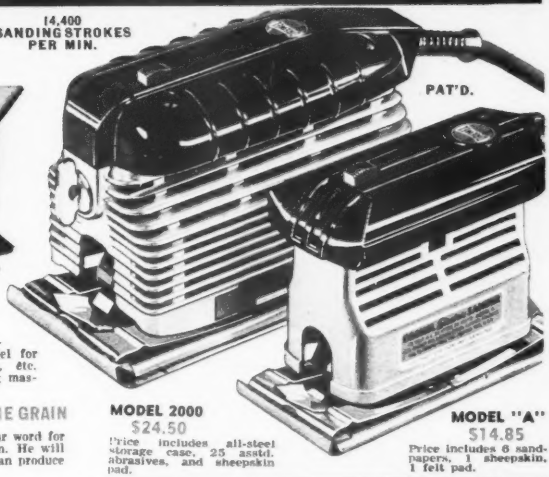

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Fastest seller in the field for rugged power and smoothest finishes at lowest cost. Ample power for furniture and cabinet making, boat building or refinishing, resurfacing large areas. Great for building operations—woodwork, stairs, dry-wall joints, siding, etc. Does a superb polishing job! Weighs 5 lbs.; 21 sq. in. of sanding surface; over-all size 3⅛" x 4½" x 7".

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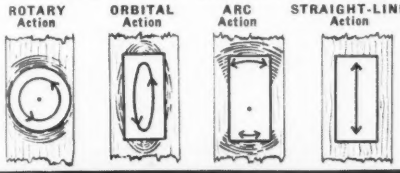

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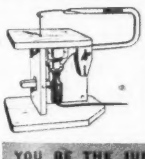
CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS

MAKE YOUR OWN JIG SAW

PLANS FREE!



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For home, hobby, repair work—no other tool pleases so much for so little cost. Works in any direction—delivers 7,200 strokes per minute smoothly, effortlessly. Saws through ¾" medium-hard wood at a foot-a-minute speed. Touch-of-the trigger, foolproof action. Only 2 moving parts, never needs oiling. Uses 110-120 V., A.C. Free plans, packed with each saw, for six useful woodworking projects and for making your own jig saw.

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MOTO-TOOL No. 2 (with 1 emery wheel point) $16.50

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YOU BE THE JUDGE OF DREMEL PRODUCTS—Our reputation has been built on results rather than sensational claims. We invite comparison of Dremel tools with any similar products made. Then you'll know why we guarantee the most for your money!

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Take it from an old Pro—

"YOU'LL SHOOT BETTER WITH A MARLIN .22!"

says Andy Russell of Twin Butte, Alberta, Canada —famed guide and authority on big game hunting, fishing and wildlife photography

THE MARLIN 39-A—*Only American-Made Lever-Action Repeater.* Handles fast as lightning. Loads 25 Short, 20 Long or 18 Long-Rifle cartridges without adjustment—regular or high-speed. Solid top receiver and side ejection permits lowest possible central 'scope mounting. Ballard type rifling—just like Marlin's famed high-powers!

AND FOR SUPER-SMOOTH SHAVES—
NEW MARLIN MAGNETIZED BLADES!

12 BLADES ONLY 25¢

Marlin's magnetizing process makes even sharpest blades smoother. New Safti-Quik Wrapper protects fingers. • Just hook blade onto razor, wrapper slides off. New *Magnetized* Marlin Blades, double-edge, 12 for only 25¢. Available in U. S. A. and Canada.

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Send me catalog with information and photo-illustrations of Marlin Guns. I understand you will also send me pack of (please check) . . . single or . . . *Magnetized* double-edge Marlin Blades. I enclose 10¢ for handling.

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Hunting Snowshoes

[*Continued from page* 94]

pheasant hunting and perhaps a month of shooting on other birds, plus six weeks on waterfowl. Most of these seasons fall between October and December. But after the bird seasons have closed, as well as while they are on, you can still hunt rabbits. Many states have four to six month seasons and some have no closed season at all. So when you can hunt no other edible game, the rabbit is a good excuse for taking to the woods and fields.

Some hunters have been frightened off by the too greatly emphasized threat of tularemia, a disease carried by rabbits and one which can be transmitted to humans by contact. Except in the southern states, there is very little tularemia and I believe there has never been a case reported north of the Connecticut line. Usually a rabbit suffering from this ailment can be detected without trouble for it is weak and will run only a short distance. In the event a hunter comes across one of these rabbits—and I have encountered exactly two in 30 years of rabbit hunting in at least a score of states—it should be shot and left where it is.

If you must handle the rabbit, danger of infection can be eliminated by wearing gloves. Even one that is infected with tularemia can be eaten without harm for cooking immediately destroys the germ. More hunters have been killed by the kick of a kangaroo than have been infected with tularemia by rabbits.

The beagle, of course, is not the only breed used in chevying the cottontail. Many hunters prefer a larger, sturdier hound for snowshoes and you will see plenty of redbones, blueticks, walkers and assorted crosses used for this hunting. Some of these animals may come under the "potlikker" classification but regardless of ancestry, many of them are real "meat" dogs.

Right now the big snowshoes have shed their summer brown and are as white as the snow over which they run. When you get a free day, take a shotgun out of the closet, put on some warm clothes and look up a man with a good hound. In some areas they put the shotgun aside in favor of a .22 rifle, arguing that this provides more sport. And, if you miss the first shot, the chances are the hound will push the rabbit around for another try.

Incidentally, any real chef will roll his eyes at the mention of rabbit. It is a tasty dish whether fried, broiled, braised or stewed. And, when all is said and done, the common rabbit provides more food for more hunters over a longer period of time than all of the other upland game birds and animals combined. •

Super-Windmills

[*Continued from page 76*]

weather and act as a protected duct for the power lines. The addition of a third impeller unit would increase the power outlet by 50 per cent while increasing the overall weight of the rotating head by but 25 per cent. Mounting small, individual generators in each impeller nacelle not only balances the weight of the wheel but also eliminates weighty, vibration-producing shaft transmissions. Instead, simple power lines are led through the pylons and elevator shaft to the ground where the heavy elements of the plant are installed in a substantial building. This placement of the generators, converters, etc., materially lightens the tower structure.

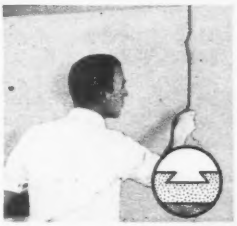
Dependent on the ever-changing wind, a single aerogenerator obviously can not be relied upon for continuous or "firm" power. However, interconnected but scattered units can maintain a firm average output. Tests indicate that wind velocities in given locations remain constant for 22 out of the 24 hours. This can be enhanced further by placing the aerogenerator groups in mountain passes where converging ranges funnel the wind flow in a strong, steady venturi effect. Such groups, acting as a free-fuel auxiliary to established steam or hydroelectric systems, may supply up to 40 per cent of the total utility power. During slack periods of consumption, this aero energy can pump used water back into reservoirs, thus storing power for future use. This means that during droughts, scarce water can be used to develop power over and over again.

As compared with complicated steam power plants and the vast sums spent on hydroelectric dams and reservoirs, the first cost of the aerogenerator is modest. Even this would be considerably reduced by the limited mass production necessary to produce a moderate number of aerogenerator complexes. Once installed, operation costs are extremely low.

European experts, working under the Marshall plan, have launched a research program to speed the harnessing of the wind for electricity. England is said to be three years ahead of us in development. Recently a German engineer entered the field with a proposal to build 1,000-foot wind towers to provide power for the industrialization of Schleswig-Holstein.

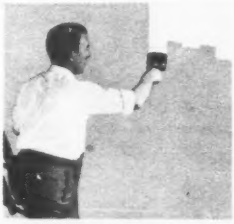
Russia led the world in aerogeneration development during the 1930's but like most other Red scientific projects its postwar status is veiled by the Iron Curtain. In her desperate effort at industrialization, she may seize the lead again. Meanwhile, with Congress now alerted to the opportunity, we can hope that America is awakening to the possibilities of this great, free source of untapped power. •

Pointers for home painters Walls:

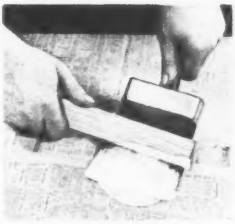


When replastering small areas, cut out all loose plaster. Leave indentation (see insert). Wet new edges with warm water before applying fresh plaster.

With the tip of brush, work paint up to molding. For best results use a nylon-bristled brush of the right size — one designed for the job.



Start painting in corner at molding. Work down to baseboard. Cover a space about two feet wide. Paint last strokes into area just painted to avoid overlap marks.



For overnight cleaning, pour thinner on brush. Work out paint on newspaper using stick or paint scraper to squeeze out paint. Suspend brush in thinner.

JOB AFTER JOB you'll get best results with a well-tipped nylon paint brush. Durable Du Pont nylon bristles paint smoother . . . are clean and sanitary . . . never get brittle . . . don't break off even under the roughest treatment. And nylon bristles last from 3 to 5 times longer than ordinary bristles. Leading manufacturers make nylon paint brushes in all types and sizes. Look for the name NYLON on the handle. Be sure to pick the size brush designed for the job . . . and demand Du Pont nylon bristles.

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living
through Chemistry

The best brushes have
DU PONT NYLON
BRISTLES

The Plane

[*Continued from page* 112]

The longer ones are available with either smooth or corrugated bottoms, the latter offering somewhat less surface friction.

An excellent plane trio for the average shop consists of a 6-in. block plane, a 9-in. smoothing plane and a 14-in. jack plane. With these you can tackle everything from cigar boxes to storm windows.

Adeptness in handling a plane comes only with practice. The initial requirement is that the work, regardless of its size, must be anchored securely so that it can't move. If it wobbles or gives even slightly, you won't be able to make smooth, straight cuts.

Don't oil any part of a plane. Just keep it clean by brushing it out frequently. Check the bottom for smoothness and keep it free of paint, wood sap and other goo. An occasional going over with fine emery cloth is helpful. Dress down any roughness on the edges of the base with a file. Tighten the handles with a screwdriver when they show the slightest sign of looseness. Block planes tend to rust because they are grasped almost all over by the user's hand, which soon becomes sweaty. Wipe them well after each use, and rub down red rust blotches with emery.—*Robert Hertzberg* •

Water Wagon

[*Continued from page* 140]

leg clearance. Turn this subassembly right-side up.

The three bulkheads, the transom, and the bow should be assembled separately and installed before the sides are put on. Each of the bulkheads consists of ⅜-in. plywood panels, 1½x2-in. framing, and 1x4-in. house-top beams. Taper the latter to 2 in. deep at the ends. Run 2x2-in. inner chines the length of the boat.

The transom and bow are framed with 2x2-in. stock. A 2x6-in. piece of oak, properly beveled, ties the bow to the bottom. Next add the sloping house front and the ⅜-in. plywood sides.

Install the remaining house-top beams, cover them with plywood, and finish with canvas.

Bolt on the 2x4-in. guard rails and the 1x3x6-in. guide blocks. Put in the fore-and-aft bulkheads in way of the shower and water-closet compartments.

A detail shows the wheel-and-bait wells. Fabricate them and mount them over holes cut in the boat's bottom. Make port holes as shown and install them. Assemble doors and add them to the boat. •

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Notice how much better your pipe tastes—how much fresher your mouth feels when you switch to Kentucky Club. Look for the blue tin with the picture of the red-coated rider. Send for free catalog showing fine pipes and how to get them at big savings. Mail Pouch Tobacco Co., Wheeling, West Va. Dept. 85

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Fact is, you can wander all over the chart... with speed, comfort, minimum cost... in a snug and able cruiser *powered by Big Twin!* Furthermore, you can "trailer" your boat *anywhere,* to waters of your choice. Your cruising horizons are *limitless!*

Big Twin is the motor outboard cruising had been waiting for. A motor with abundant power to reel off the knots on substantial cruising hulls. A motor with *Gearshift* for neutral starting and full maneuverability, and engineered for complete remote control. Above all, a motor with *stamina* for trouble-free performance from shove-off to home-again!

In a single season, on coastal and inland waters everywhere, Big Twin has won its place as the motor for practical, low-cost cruising. If you'd like the whole story, see *your Evinrude dealer!* You'll find his name in your phone book under "Outboard Motors." For free catalog of the complete line of Evinrude models, write EVINRUDE MOTORS, 4764 N. 27th St., Milwaukee 16, Wisconsin.

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FIRST IN OUTBOARDS...43rd YEAR

Ben Hardesty—for 4 straight years U. S. Professional Casting Champion!

Use the Rod the Champ Uses...

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Now yours for as little as **$7.95**

(A Full Length 5'2" Rod!)

Yes, now you can get the rod the Champ uses for the same price as many ordinary glass rods. We say ordinary, because Shakespeare Wonderods are Howald Process built—with hundreds of thousands of *parallel* glass fibers *strung under tension and double bonded.* And only Wonderods have 1-2-3 Zone Action. (See illustration.)

1. ACTION ZONE. Fast tip action for bullet-like casts!
2. POWER ZONE. Power to set the hook!
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Also ask your dealer about the new fly fishing, spinning and salt water Wonderods. Bait casting Wonderods are $7.95 to $27.00.

FREE! Write for **1952 Catalog,** Fishing Calendar and inside story of glass rods. Dept. MI-3

Shakespeare

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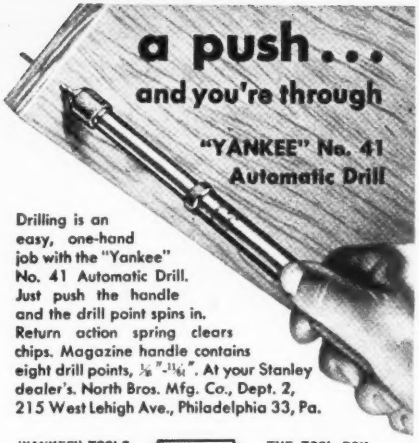
Kalamazoo 2, Michigan



a push... and you're through

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FP-23

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Bright floors Quickly Quietly

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Table-Top Rodeo

[*Continued from page* 123]

is merely whirled around to change its direction.

The figures are scroll-sawed from ⅛-in. material and painted in realistic colors: horses brown, spotted, and white, the steer and calf in brown and white patches. Outlines of these are given in figs. 7 and 8.

Assembly is illustrated in fig. 9, but you may shift the locations of the various figures to your own preference. Two knobs at opposite corners are provided for lifting off the plywood top to which figures and mechanisms are attached.

In scoring you can make your own rules. It is suggested that unseating the rider of the rearing horse should count five points, as any experienced rider should be able to stay aboard in this sort of maneuver; the kicking horse gets four points when its rider is thrown, three points for unseating the buckaroo on the bucking horse, and if any man cannot stay with the little burrow, the player runs up ten points. Throwing the steer is a five-point demerit and if the roping cowboy goes over in the same play, it is a tie. But if the latter is thrown, player adds three points provided the steer is left standing. Two points are added to score for throwing the rider chasing the calf, but if the calf is whirled around, changing his direction, three points are added. A winning score is fifty. •

—*Hi Sibley*

Double-Duty Hassock

[*Continued from page* 141]

the frame. Nail it in place. Cut a second piece, a fraction of an inch smaller, so it will be an easy fit. One of the long edges must be cut on a bevel. Hinge this piece to the piece that was nailed in tight, recessing the hinges so they are flush with the wood. The beveled edge of the hinged piece allows it to be closed without binding against the box frame. Inside the box, ¾ in. down from the top edge, fit two small blocks of wood to support the hinged half lid when it is closed.

Cut the upholstery strip 13½ in. wide and 54 in. long. Fit the strip around the box, folding under the edge that laps, for a neat fit. Tack to the bottom of the box, then to the top. At the point where the hinges are attached, the covering fabric must be cut and the strip the width of the hinges tucked down inside the covering around the box.

After applying covering to both lid and box, fasten the hinges and the chain to the lid again. Furniture glides fastened to the four bottom corners complete the piece. •

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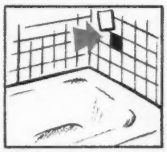

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Pylon Plane

[*Continued from page* 143]

boom. They can be plugged directly into 110 v. AC, and require only a single gear reduction.

Remove the gear carrying plates and gears from the motor, and press the 24-tooth gear that meshes with the motor worm from its shaft. Drill out its bore to ¼ in. to fit the pylon shaft. Solder the gear to the shaft. Drill the original gear shaft holes in the gear carrying plates to receive the ¼-in. tubing nuts used for the shaft bushings. Assemble the bushings. Cut the gear carrying plates as shown, then hacksaw the motor mounts from $\frac{1}{16}$-in. angle iron.

Bend the boom as shown, drill the No. 40 hole and cut the $\frac{3}{32}$x½-in. slot for the control wire. Cut a sector from one bobbin, and silver solder the bobbin flanges to the boom, directly over the slot. The slot, the rim of the bobbin hub, and the centerline of the shaft bore must register, so that there is no interference with the wire.

Remove the clip lever and spring plate from the clip before soldering to prevent heat damage to the spring. The counterweight mold is a ½-in. pipe nipple with one end stopped with putty. Insert a section of tubing the same diameter as the boom, and pour lead in the annular space between the tubing and the nipple. Trip the weight to 2½ oz., and force over end of boom.

The lower yoke and its bobbin can be screwed to the underside of the base, so that the edge of the bobbin hub is directly under the shaft centerline.

Pour 6 oz. of lead over the crown gear. Insert the flywheel in your drill chuck and trim down the flywheel, using a knife or bearing scraper for a cutting tool. The effective material in a flywheel is in the rim; material around the hub has no effect other than to load the motor bearings.

The plane's fuselage, wheels and propeller are from an Olin plastic model of a Beechcraft Bonanza. The nicely cambered wing and tail surfaces are from a dime store balsa glider. Enlarge wing slots in the two fuselage halves, cut slots for tail surfaces, and slot wing and fuselage for the $\frac{1}{16}$x¼x1¼ Lucite tab.

While this type of motor is not adaptable to rheostat control of acceleration and deceleration, a 200-ohm, 15-watt rheostat can be used to limit the maximum motor speed, if desired.—*Richard Lieto* •

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Cut-off Machine

[*Continued from page* 144]

Remove all parts from the mandrel housing and substitute a couple of old bearings in place of the good ones while the welding is being done. The purpose of this is to prevent damage to the good bearings and to prevent heat distortion in the mandrel housing. If you do not have the old bearings, you can dampen some powdered asbestos and fill the inside of the housing; after it has cooled, remove all the asbestos and wipe clean and dry and replace the shaft, bearings, etc.

Using an angular drop, make the top, bottom and vertical support rails or tubes one piece. This results in far greater strength in the main frame.

The bottom support of the swing table is made from a piece of ½-in. pipe, two pipe couplings and two ½x¾x1-in. bushings. The couplings are threaded onto the pipe a short distance and the bushings are pressed in after the welding is completed. The vertical supports are made from ½-in. thin-wall conduit welded to the bottom support and to the V table. This table is left in one piece until the entire is completed and cutting wheel and guard are in place. Start the machine and cut the blade slot with the machine itself.

The lower portion of the guard covers about one-third of the wheel. Place it so that the table will move over the front edge of it. The upper portion of the guard is slotted as the sides where it drops past the level of the shaft and has a beveled rise at the front which permits the work to raise the guard as it moves into cutting position.

A ½-in. stud is provided for the guard and is welded to the underside of the left rail. The mounting rings are attached to the top and bottom sections of the guard are ½ in. thick by 1¼ in. in diameter and drilled to fit the ½-in. mounting stud; a spacing washer is welded to the stud next to the frame.

The outer ring attached to the lower guard is secured to the stud by means of the set screw seen on the rear of the ring.

The V-loop is bent in the strap iron edge of the lower guard leaving a discharge opening for the escape of cuttings. The short chain between the screw eyes limits the outward movement of the table.

By removing the guard and cut-off wheel, the machine may be used as a heavy-duty grinder stand or a cut-off saw.

In operation, remember this vital rule: never use a cut-off wheel without the guards in place. Don't forget, most cut-off wheels are rather brittle and will shatter if dropped. Handle carefully and always store between cardboard stiffeners.—*George J. Pero* •

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Do Cycles Rule?

[*Continued from page* 63]

versity, made a forecast on residential building construction through 1950. The crest they predicted for 1942 began on schedule but succumbed to war conditions and the high point, due in 1944, was delayed until 1946. The regular swings then snapped right back as the professors had anticipated and hit a high in April, 1950, exactly as predicted 11 years earlier.

Professor Rex B. Hersey of the University of Pennsylvania, after exhaustive analysis, learned that individual males tend to have their own emotional ups and downs in rhythmic cycles which may vary from two and a half to nine and a half weeks, depending on the person.

Another study showed that more crimes, suicides and cases of insanity occur in summer than at any other time of the year.

Now about wars. Dr. Raymond H. Wheeler, head of the psychology and philosophy department of the Babson Institute of Business Administration and chief of staff of the Climate Research Division of the Weather Science Foundation, has prepared the most complete index of wars ever published. It presents a detailed graphic picture of the wars which afflicted mankind from 599 B. C. on.

Analyzing the chart, Mr. Dewey of the cycle foundation has this to say:

"There is a scientific basis for the popular belief that major war periods recur at intervals of about 22 years. Major periods of international conflict are, therefore, at least partially predictable.

"But do not let this lull anyone into any false sense of security. Every year past 1953 or 1954 increases the danger and, by 1960, international conflict should be quite severe if tendencies of the past continue."

And, concludes Mr. Dewey, the peak will probably be reached in the early 1960s.

A vital implication of studies on wars is that they may throw some light on the more fundamental causes of conflict among nations. "Some day," Mr. Dewey says, "it may be found that mankind at certain periods is more excitable and commits acts which lead to wars, while at other times people behave more conservatively."

And now about the stock market. A new study, completed last June, showed that there has been a cycle of about nine years in length in industrial common stock prices.

"As nearly as can be determined at present, the length of this cycle is 9.2 years," Mr. Dewey says. "This is the most important single cycle discovered to date in industrial stock market prices."

But there is an important point to consider, and it demonstrates the weakness of cycle study in the stock market up to now. You can't—at least not yet—say with assurance that the market will hit a high every 9.2 years. and thus make a killing every time. You can't do it because this 9.2 cycle is only one of many forces operating in the stock market, just as flour is only one of many ingredients in chocolate cake.

Nevertheless, patterns are clearly evident—off in timing here and there, but apparent. And, says Mr. Dewey, "the next crest of the ideal wave is due late in 1955."

Nobody knows the why of cycles. Science admittedly doesn't know the answer yet. But science in the meantime is using the knowledge it does have to throw light on the future.

That light may shine on women's clothes—female fashion cycles, it has been discovered, run for 35 years, from body-hugging modes to full bustles.

Prediction: At the rate things are going, we can expect bustles back in style in 1970.

Or that light may shine on the future of the world—Dr. Wheeler has noted a correlation between history and climate cycles of 45, 90 and 510 years. When warm seasons replace cold ones, the world basks in a period of idealism, such as the Italian Renaissance. In cold periods, regimes topple, cruelty takes over, dictators come to the fore, the birth rate drops.

Prediction: The world will enter a cold trough in 1980 and come out of it in the year 2000, when the brotherhood of man will reign in a universal democracy, and tolerance, international amity and good will envelop the earth and its people.

Do cycles really rule your life? Well, as recently as last October, cycle students came up with this almost unbelievable fact: a 37-year cycle was plainly seen in 12 separate and completely unrelated things, ranging from wheat and cotton prices to the frequency of sunspots and the growth of Arizona pine trees!

The scientists reached back 1,500 years and found the same 37-year interval in the frequency of the aurora borealis, the recurrence of Chinese earthquakes, floods of the Nile River, temperatures at New Haven, Conn., severe winters in Europe and a number of other things.

Only an accident of cosmic proportions? "Certainly," say the unbelievers. "Hardly," say many reputable scientists. Something must be behind it, they say. Something vast, unreachable, as yet beyond the grasp of man's intellect.

Certainly scientists are now striving toward an understanding of this mystery. And if and when they finally come to know all about cycles, the world may be shocked to discover that its destiny is in its own hands. •

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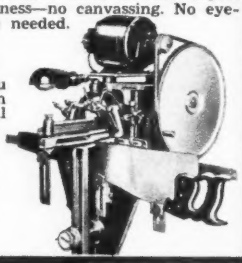

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Golden Signatures

[*Continued from page* 69]

Confederate soldier. His ancestor was not a famous man but the letters painted a vivid, authentic picture of life at the front during the Civil War. They brought a tidy sum.

There is always a demand for new source material that sheds light on some phase of our country's history. Perhaps one of your ancestors took part in a famous Indian fight or helped to explore western territory. If you have letters that describe such adventures and the territory in which they took place, you have material that may bring you handy cash. Since the N.S.A.C. keeps a record of the specialization of each member, it's easy to contact fellow collectors if you want to sell or trade your finds.

Holographs—letters written entirely by hand—are usually worth more than typewritten ones or letters written by secretaries and signed by the individual. Ordinary holographs of Franklin D. Roosevelt, Herbert Hoover and President Truman might bring from $100 to $500 each, whereas signed, typed letters by these presidents may not be worth more than $10. President Truman's letter calling the Marines "the Navy's police force" with "a propaganda machine comparable to Stalin's" was recently bought by a Chicago insurance man and enriched the Marine Corps League to the tune of $2,500. An equally high price was paid by a Connecticut man for President Truman's letter to Paul Hume, the Washington music critic.

A George Washington letter of routine content is worth about $100 but one written while he was encamped at Valley Forge may bring between $200 and $1,000. If you can dig up some of his writing pertaining to either his inaugural or farewell address, you might ask between $2,500 and $5,000 for it.

In your search for valuable documents and letters, you should also be on the lookout for handwritten material that bears no signature. Before Washington decided on the inaugural address which he delivered, he wrote a much longer version of it in longhand. That draft of his planned address had 62 pages and so far only 16 pages and four fragments have been discovered. The manuscript was handed out, page by page, by historian Jared Sparks in answer to requests he received. So, if you should come across a 9-by-6½ inch page in the handwriting of the first president, it might well be part of that valuable manuscript.

A signed photograph of Joseph Stalin was recently sold for $85. There are a great many Hitler autographs but they are worth little at present because of their abundance. Generally, a hero's autograph is much more de-

sirable than a villain's although a letter of Benedict Arnold in which he gave a truthful account of his treason brought $2,850.

How do you go about acquiring a collection if you have no large amount of money to spend? Well, there's a man in Baltimore, Md., who has an unusual and widespread collection, geographically speaking. For years he has been writing to kings and queens, statesmen and scientists all over the globe in an effort to acquire their autographs. He doesn't just ask for their signatures—he compliments them for some achievement and asks their opinions on matters of political or scientific significance. And he has a very high percentage of replies. Because these celebrities often answer his comments or questions in detail, their autographs are of considerably more value than mere signatures.

It's not a recommended practice, but some autographs can be acquired by trickery. Franklin D. Roosevelt, for instance, used to ignore all requests for autographs. One fan didn't give up so easily. Taking advantage of F. D. R.'s weakness for bargains in postage stamps, he wrote to the late president, offering him a choice collection for a nominal fee. Roosevelt promptly responded with a check for the stamps and the autograph fiend was able to cash the check for considerably more than its face value.

Sometimes city, state and federal government bureaus are seized with spring cleaning fever and rashly destroy papers and documents which would be priceless to posterity. Walter Fetter, a Philadelphia business man, attended the disposal sale of 40 tons of miscellaneous papers taken from the Philadelphia custom house. The papers had supposedly been examined for possible valuable material. But, though Fetter was only a neophyte collector, he knew that there might be real valuables lurking in the mass of doomed papers. So he bought a load of them cheaply and sure enough, after careful scrutiny, he came upon several letters and documents whose value was about ten times the purchase price of the whole lot.

How much should you pay for collector's items? Well, you can familiarize yourself with current prices by asking some of the dealers for copies of their catalogs. Usually they are free or else there is only a nominal charge for them. Another source which you may find helpful is a yearly publication called *American Book-Prices Current* which lists the auction prices of books and autographs that were traded in the U. S. during the year. You can probably locate this book in your public library.

And watch out for forgeries. If someone offered you letters written by Cleopatra to

[*Continued on page* 179]

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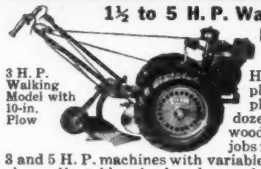

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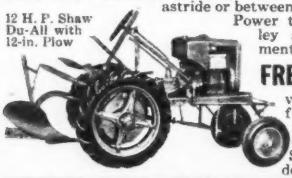

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Golden Signatures

[*Continued from page 177*]

Julius Caesar, by Lazarus to Saint Peter, by Alexander the Great to Aristotle, what would you think? In the middle of the nineteenth century a forger by name of Vrain Lucas produced more than 25,000 of such autographs and managed to sell many of them. Lucas took the trouble to mix special inks and to make the letters look very ancient but the paper he used came from local French mills and most surprising of all, they were written in modern French!

Experts give this advice: Don't deal with strangers where big values are involved but do business with dealers whose reputations are established. Good forgeries can usually be spotted only by the experts but you may be able to detect facsimilies made by rubber stamps. A quick test is the application of one of the standard liquid ink eradicators to the tail of the signature. Usually you can also tell a rubber stamp from a good signature because the stamp leaves a uniformity of ink not left by a pen.

It sometimes happens that collectors have authentic articles and don't realize it. A Virginia college boy recently bought an address by Thomas Jefferson, supposedly copied by a contemporary. After careful scrutiny, the boy discovered that the speech was actually in Jefferson's own handwriting and thus worth considerably more than the original purchase price.

Not an autograph collector, but a shrewd student of the field was the late Bernard Shaw. Like all great and wealthy men, Shaw was constantly being bothered by requests for handouts from people whom he knew only slightly or not at all. Shaw was not noted for his philanthropy and managed to disregard these letters completely without a twinge of conscience. But he was far from hard-hearted.

For instance, one real friend, whom Shaw knew to be destitute, would never stoop to the level of begging for money from his friend. Shaw realized this and periodically, would drop him a simple innocuous note, asking after his health.

The shrewd Shaw, having checked on the market value of his letters, knew that his friend could sell them for a substantial sum of money. And best of all, it only cost Bernard Shaw a postage stamp!

So, don't despair because you can't afford to buy the Declaration of Independence or the British Magna Carta. There are other autograph treasures to be found. They may be filed away in your attic, in a trash pile or in some office cabinet. But rest assured that astute autograph collectors are already out hunting for these golden signatures. •

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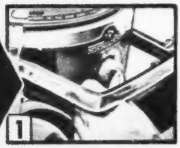

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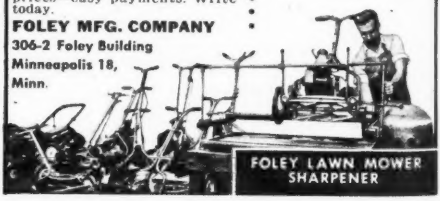

FOLEY LAWN MOWER SHARPENER

Zoo's Who

[*Continued from page* 105]

poachers and illegal hunters, may have better luck in the future—Florida authorities are endeavoring to establish them in a well-guarded refuge.

A world-wide picture of rare animal life was presented by Dr. Antoon de Vos, of the Canadian Department of Lands and Forests, in a report to the United Nations International Technical Conference on the Protection of Nature at Lake Success not long ago.

Heading the de Vos list is the mammoth rhinoceros of Java. These five-ton creatures, which are of the one-horned type, were almost wiped out during the war—the Japanese troops who occupied Java used them for target practice.

"The only thing that saves those which remain," said Dr. de Vos, "is the fact that they live in jungles which are infested by tigers. The natives like to shoot the rhinos, but they fear the tigers so much that they seldom dare to go on the hunt for them."

Then there's the pig-footed bandicoot of Australia. This creature, while probably not as strange as the New Zealand tuatara, surely qualifies as one of Nature's outstanding oddities. In appearance it is something of a cross between a large rat and a rabbit, usually about 10 inches in length. The feet of this creature resemble hooves. It's a marsupial, in the same general order as wombats and kangaroos.

The bandicoot's big headache is eating. It dines on the same grasses and plants as sheep and rabbits. Since sheep and rabbits have been on the increase, they get there first, gobble it all up—and the little marsupials starve.

To make matters worse, the bandicoots themselves are on the bill of fare of wild dogs and Tasmanian wolves. Because they are so sharply on the decrease, the wolves, too, are going hungry and face possible extinction. It's a kind of a vicious cycle—no grass, no bandicoots, no wolves!

The royal chinchilla of Peru is another rarity cited by Dr. de Vos. Once fairly numerous, these little fur-bearers have been slaughtered illegally for their pelts and today only a few survive in the inaccessible rock-strewn reaches of the Andes.

A parallel might be drawn between the Peruvian royal chinchilla and the American wolverine. The latter was once such an important source of milady's furs that Michigan was dubbed the Wolverine State. Today wolverines flourish only in the wilds of Alaska.

The European wisent, somewhat similar to the American buffalo, is on its way out unless given protection, according to the de Vos re-

[*Continued on page* 183]

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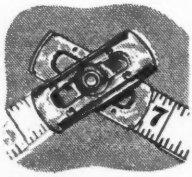

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Zoo's Who

[*Continued from page* 181]

port. Ditto the Asiatic lion, of which 200 or less remain.

The last time noses were counted, according to Dr. de Vos, there were no more than 500 giant sable antelopes left in Africa. So they, too, must be classed among Nature's rarities. There are only a few hundred brow-antlered deer remaining in Burma, and most of the few South African mountain zebras still alive are caged in zoos.

How can these vanishing animals be saved? Only through preserves and more stringent game laws, Dr. de Vos told the UN conference. Whether his recommendations will be carried out in the present jittery state of world affairs remains to be seen.

Rarity may mean one thing to a museum curator, another to a zoo keeper or a campus scientist and still another to Henry Trefflich.

Trefflich, whose base of operations is New York City, is one of America's leading importers and salesmen of birds and animals.

"What's the rarest thing I brought in recently? Well, let's see," he says. "I'd say it was the 18 quetzals from Costa Rica.

"Quetzals are birds that live in the jungle. The males have very long tails and their plumage bears all the colors of the rainbow. They're about the size of chickens. Their claws are so curled-up from clinging to branches that they can't walk on a flat floor.

"I sold some of those quetzals to zoos in Cincinnati and Cleveland. I've still got some on my hands.

"The next rarest article? Well, I'd say gorillas and orangutans. For 25 years nobody brought them into this country until we took the first step. I believe there are 36 gorillas in the United States now and 40 orangutans. Because of new restrictions, no more will be brought in for a long while."

And what would he most like to get hold of in the rarity department.

"A hairy tapir," was the dreamy answer. "They hang out in the central part of South America. There aren't many of them and they're awfully hard to find. I'm not sure, but I think there may be one in captivity in this country. Certainly no more than one."

So, if you're thinking of starting that hypothetical collection of the world's rarest creatures, you'd better keep a sharp watch for hairy tapirs, quetzals, coalacanths, tautaras and the like. And it won't hinder you at all to have several million dollars available, too. •

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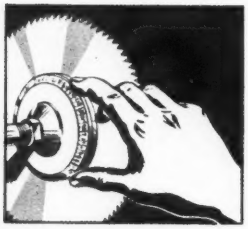

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Photograph Your Shop

[*Continued from page* 151]

Backgrounds: In shooting close-ups of operations on a bench or machine, remember that a cluttered background can detract from what you are trying to show. The drill-press pictures show this effect rather strikingly. In the first photo the drill press is lost against a mass of contradicting and interfering shelves, containers, wall boards, and the eye doesn't know where to start or stop. The second picture, taken from exactly the same position and with the same lighting, is clear and bright, and has an almost three dimensional effect. The entire trick was performed with a couple of sheets of ordinary white drawing board, one behind the drill press and the other on the right side of the drill press table.

Human interest: Many shop scenes look more interesting with people in them, and certain types of close-up pictures require at least a pair of hands to show how an operation or process is performed.

Print size: For your own purposes, use paper of any kind you like, and as small or as big as you like. For publication purposes, however, prints should be on glossy paper. Editors prefer 8x10 glossy prints made from sharp 4x5 negatives. •

Laying An Egg

[*Continued from page* 80]

To prove his point to skeptics, Weiss imported from South America five Auracuana chickens that lay green eggs. Although Weiss proved beyond a shadow of a doubt that the color of shells had nothing to do with quality, customers still insisted on white eggs.

When chicks are about 12 weeks old, Weiss vaccinates them against fowl pox and bronchitis, immunizing them for life. In this way, he keeps his mortality down to almost zero.

What's more, when the chickens are raised in cages, they are free from poultry raisers and farmers who are common carriers of virus. Weiss does not allow poultry dealers in his plant for just that simple reason.

Weiss' egg ranch has turned into a tremendous business, contracting for feed by the year. He uses two tons of mash each week plus 500 pellets. He breeds about 3,000 chickens a year. Oddly enough, his operation is run by just himself and one helper for the compact system is very efficient. And this two-man operation brings a fine return to the men who run it.

When people say that Murray Weiss' business is laying eggs, he just laughs. "Sure," he says "golden eggs." •

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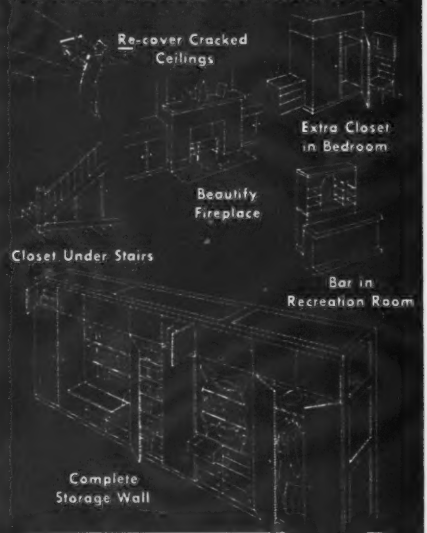

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Shop-Vac

[*Continued from page* 133]

impeller. The inlet will be attached at this position. The 5¼x4¾-in. member attached to the mouth of the exhaust is for the attachment of the dust collector. When the vacuum is used as a blower for blowing out inaccessible recesses, the dust collector is removed and the hose connection is attached.

Rather than lead our small diameter hose directly into the impeller housing it is better to funnel it in. This is the function of the inlet housing. This is simply a box of proper dimensions to support the funnel which is formed of No. 20 gauge sheet metal, so that an opening of the hose-coupling diameter is presented at the front and a larger opening to match the impeller housing at the back.

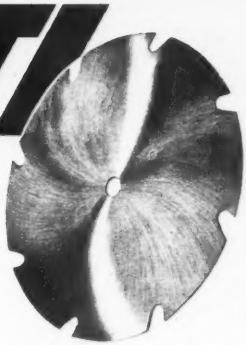
The dust collector is simply a bag of 8 ounce ticking with a plywood flange of the same dimensions as the exhaust flange. This flange is easily attached to the bag by means of an inner flange of plywood by nailing through it, into the outer flange, thus anchoring the cloth between the two flanges. The bottom of the bag is not seamed but is closed with a clamp made of a folded piece of strip metal as shown so it can be emptied easily. The bag or other dust collector should be designed so that it does not create too great a resistance. In fact, increasing the size of the bag to twice the size shown, would no doubt increase the efficiency of this unit. If you do not care for the bag type of dust collector and wish to experiment with other kinds, bear in mind that all air entering the system must find its way back into the atmosphere quite rapidly, otherwise excessive resistance is created and the suction falls off rapidly since air cannot enter at the inlet. The only purpose of the dust collector is to filter the foreign matter from the air and this it must do while permitting the air to escape.

The shaft is standard ½-in. steel shafting. The length may vary somewhat according to the motor to which it will be coupled by means of a V belt. The impeller is mounted on one end and a small diameter pulley on the other end of shaft. As indicated earlier, impeller should be pinned onto the shaft because of the relatively high speed at which it will rotate.

The bearing mount, made of hardwood, should be bolted to the chassis with four bolts so that there can be no shifting of the bearings and shaft assembly.

The motor mount is hinged to the chassis in position so that the motor pulley will be in perfect alignment with the impeller-shaft pulley. Some vacuum cleaner motors operate without lubrication. If so, this is plainly stated on name plate.—*Arthur H. Smith.* •

PTI



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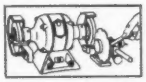

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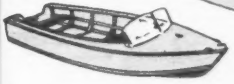

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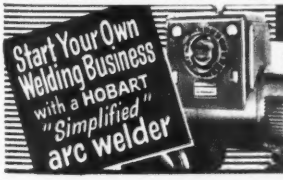

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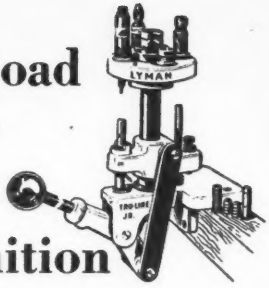

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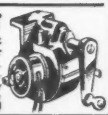

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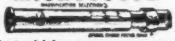

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Telescope Maker's Page

[Continued from page 156]

lenses costing $2.50. It is a 3 in. refractor and is mounted in a linoleum tube with twelve coats of shellac on it. The draw tube is a paper towel tube, also shellacked. It slides in two wooden rings spaced by a cardboard tube. The objective lens cell is cardboard, also held in place by cardboard tubes. The tripod was built from MECHANIX ILLUSTRATED *plans, naturally. It is a wonderful tripod design and deserves a better 'scope. I built it primarily for a 6 in. reflector which I still haven't built. The tripod is very sturdy, but of course is not ideally suited to a refractor, as it is designed for a reflector.*

My college wants me to build them a reflector using ready-made components, so I suppose that will be my next project. The school has a 3 in. refractor costing several hundred dollars and I have compared mine with theirs. Mine is a 72 in. focal length job, giving 96 power with a ¾ in. eyepiece. To get this power with their scope, a ½ in. eyepiece had to be used and while the image is of course considerably better with the commercial instrument, it is hard for me to see 100 times the difference in price! Mine cost a total of under $5, including tripod! It is mostly solid walnut, the legs being desk posts that were considered unsatisfactory as such. The rest was scrap lumber. The only cost was hardware, lenses and your tripod blueprint and welding. The finder scope I made from two 1½ in. diameter magnifying glasses, giving no magnification but good light gathering power and large apparent field angle and exit pupil. It, too, is a paper towel roller tube, and is mounted by adjustable galvanized iron straps. For cross hairs I originally used fine black thread, found them too coarse, now have two hairs from my own head in it. It has come to my attention that building a sturdy mounting and base is not enough to assure steady images; the tube also must be very sturdy. This is seldom stressed, but I find that my 'scope, and also the heavy brass 'scope of the college is quite unsteady in even a light breeze. I intend to beef up my reflector tube, possibly with two by fours. Actually a support at both ends would probably be desirable if it could be maneuvered to point where it is wanted.—W. Eugene Bachman •

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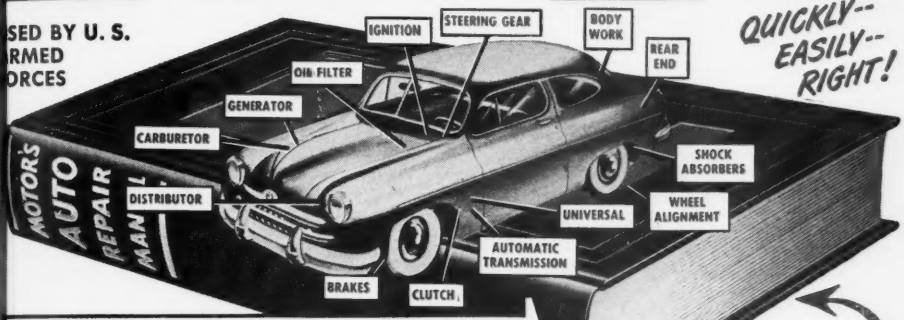

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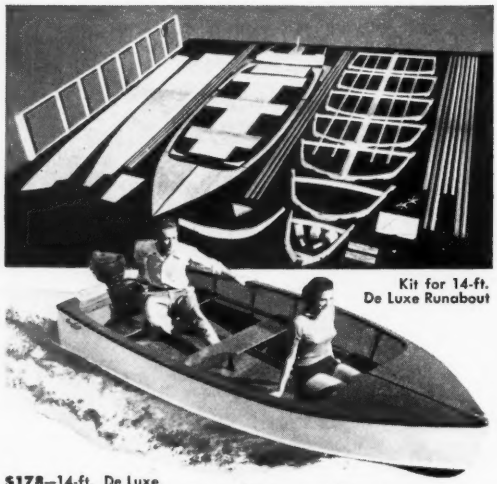

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